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NORTHERN MOROCCO

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A Cultural Geography

BY

MARVIN W. MIKESELL

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PREFACE

IN THIS MONOGRAPH I attempt to explain some features of the cultural geography 121
of the northern (formerly Spanish) zone of Morocco. The work has two related themes. I have sought, in the first place, to interpret the distribution of a selected number of culture traits. My second main effort has been to determine the effects of man's activities on the land. The cultural and physical geography of the area 121
is introduced in chapters i and ii. It seemed desirable to reverse the usual order 128
of geographic presentation and begin with culture rather than nature, for most of the processes described in this work have been initiated by man. The discussion of culture history in the next two chapters covers two millennia. It is my conviction that cultural geography is best studied in the light of origins and dispersals, which implies an unrestricted view of the past. The historical résumé in chapters iii and iv constitutes the foundation for interpretations of modern settlement and livelihood in chapters v–vii. The sum of these studies—cultural and natural, historical and modern—provides the background for an assessment of man's effect on vegetation and soil. In chapter viii the main findings of the entire work are summarized.

In a volume of modest size it is manifestly impossible to consider all elements of the landscape. By choice I have not stressed the areas of European influence and urbanization. The focus of my interest has been in rural areas where the most important goals of life are independence and self-sufficiency. The mountainous area of northern Morocco, like the High, Middle, and Anti Atlas, has suffered little from the obscuring effects of foreign influence. The Arabs, who first entered Morocco in the seventh century, had little interest in the highlands. European colonists, concerned primarily with mechanized agriculture, also preferred lands of gentle relief. All the mountain tribes have embraced Islam, some have learned to speak Arabic, and a few have adopted the Singer sewing machine. But subsistence farming and barter still govern tribal economy, and tradition arbitrates disputes.

When a Moroccan is close to home he identifies himself as an inhabitant of a 101
certain village or hamlet. If further clarification is necessary, he may add that he is a member of a community or canton (*farqa*). He will announce his tribal affiliation (*qabila*) only when he is away from home. For example, in Alhucemas one meets members of the tribes of Ibuqquyen, Aith Wariyaghar, and Thimsaman. It is only in Tetuán or some equally remote place that the same people identify themselves as Rifians. They are keenly aware of being Moroccans or North Africans only when they are abroad.

It follows that this study should begin with hamlets or cantons, and only later 121
consider differences among tribes or confederations of tribes. Unfortunately, this 128
procedure would be impractical. I have been compelled to limit my analysis to differences of large scale. Moreover, I have been obliged to focus my attention on variations in material culture. When a Moroccan is questioned about his [[124]]
neighbors, he seldom comments on the nature of their houses, clothing, or crops. His first thoughts are of personality traits, especially those he regards as objectionable. Here again, I have had to adopt a limited and somewhat distorted

121 perspective. Material traits do not include all of cultural geography, but they
128 do constitute the core of things that the geographer can study systematically.

The thesis of my study of deforestation is that the extent of change can be
121 roughly delimited by historical research and by observation of present trends.
311 In northern Morocco, as elsewhere in the Mediterranean region, the principal agents of deforestation have been (1) domestic and industrial consumption of wood, (2) burning to clear land for cultivation, and (3) destruction of palatable plant material by livestock. There is evidence that each of these agents has been active for centuries. If allowance is made for probable variations in the rate of disturbance, tentative conclusions may be reached as to the extent of change.

104 For reasons that are painfully evident to all students of Moroccan languages
or dialects, correct transliteration is difficult to achieve. Consider the word for "mountain." On French maps it apears as *jebel* or *djebel;* on Spanish maps it is *yebel*. The proper English transliteration of the classical Arabic is *jabal*. But most Moroccans know little of classical Arabic. The usual pronunciation is *jbil*, and this is the way I have written the word. I have tried to transliterate words so that they are intelligible to English-speaking readers. Thus the Maghribi Arabic word for "stream" appears as *wad*, not as *oued* or *uad*. Shawen is substituted for Chauen or Xauen, and Wezzan for Ouezzane. The variant spellings of French and Spanish cartographers are listed in the Appendix.

101 The field work for this study was carried out from November, 1955, to May,
114 1957, under the sponsorship of the Ford Foundation. I wish to acknowledge my
122 gratitude to that institution for its support. I am grateful to many Moroccans
114 who helped me to understand their land and culture. Special mention should
be made of my frequent traveling companions, Muhammad Miqqi of Ktama and
128 Muhammad ben Hmid l'Arbi of Aith Seddath. I am indebted also to Charles
Sauvage of the Institut Scientifique Chérifien for assistance in the identification of plants.

Since returning to the United States, I have profited from correspondence with
(127) David M. Hart. Mr. Hart was engaged in ethnological field work in the Rif from
1953 to 1955 and has since returned to Morocco for more extensive research. I am indebted to him for notes on many aspects of Moroccan culture, and especially for his advice on transliteration. The reader with prior knowledge of the literature on northern Morocco will be aware that I have derived great profit from
(126) study of the pioneer work of Carleton S. Coon. The illustrations of clothing and
house-types for chapters i and v were made from my collection of photographs and field sketches by Iris Neff and Jacques Lemieux.

Finally, I wish to express appreciation for the encouragement given to this undertaking by my teachers at the University of California. A preliminary version of this study was prepared as a doctoral dissertation in geography under the supervision of Professors Carl O. Sauer, Melvin M. Knight, and James J. Parsons. The present work has profited from the criticism of Professors John Leighly, Erhard Rostlund, and Clarence J. Glacken.

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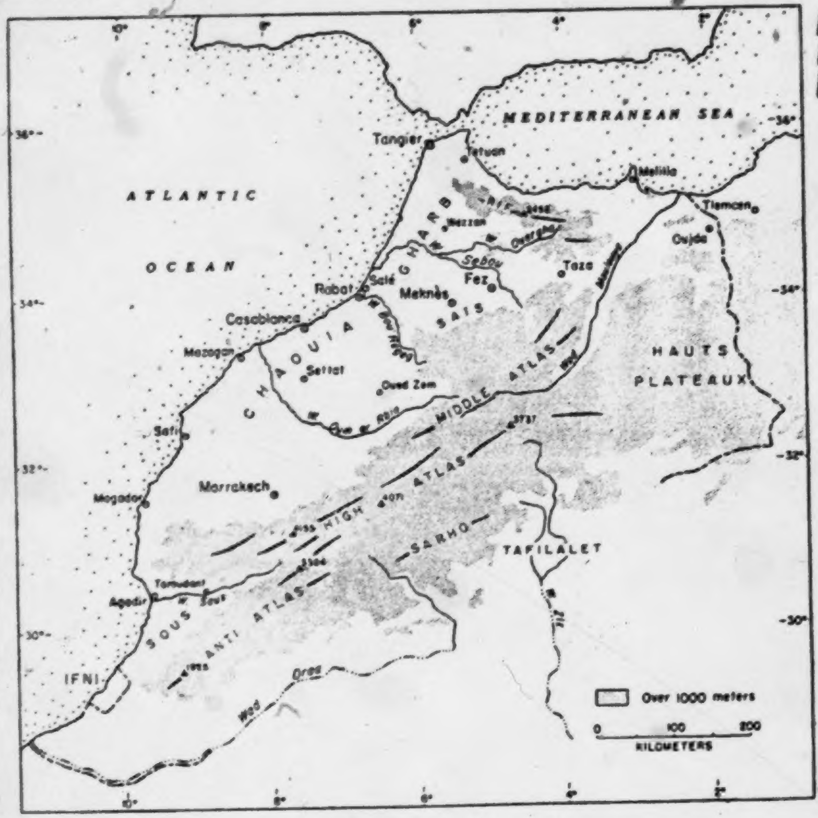
CHAPTER I

INTRODUCTION: THE "NORTHERN ZONE" 101

MOROCCANS refer to their country as al-Maghrib al-Aqsa: the "Far West" of the Muslim world (fig. 1). From 1912 until 1956 it was divided into three zones: 175
French Morocco, Spanish Morocco, and the International Zone of Tangier. In 131
March, 1956, a joint declaration was signed by representatives of France and 648



10°
8°
6°
4°
2°
MEDITERRANEAN SEA
ATLANTIC
OCEAN
36°
34°
32°
30°
Tangier
Tetuan
Melilla
Tlemcen
Oujda
Rif
Ouergha
Gharb
Sebou
Fez
Taza
Salé
Rabat
Meknès
Sais
Casablanca
Mazagan
Chaouia
Settat
Oued Zem
Oum er Rbia
Middle Atlas
Hauts Plateaux
Safi
Mogador
Marrakech
High Atlas
Sarho
Tafilalet
Taroudant
Agadir
Sous
Anti Atlas
Ifni
Oued
Over 1000 meters
0
100
200
KILOMETERS

Fig. 1. Morocco: orientation map.

102
131
133

Morocco, restoring independence. Within a month Spain resigned its protectorate, 175 131
and before the end of the year the international regime was abolished. Moroccan 648
governors promptly replaced the European administrators. Spanish Morocco ceased to function as a separate political unit, although it continued to be recognized as the northern zone. In this study the expressions "northern Morocco" 101
and "northern zone" refer to the area previously under Spanish and international 128
control.

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

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619
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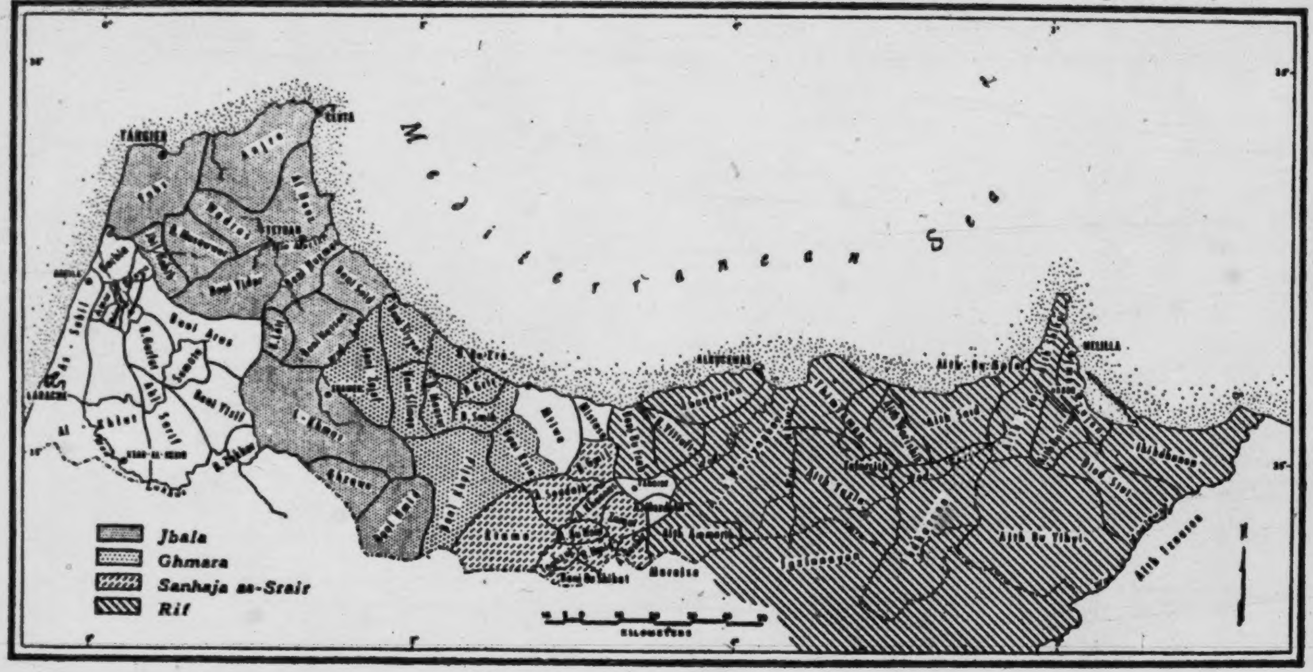
Mediterranean Sea
Tangier
Ceuta
Tetuan
Melilla
Alhucemas
Larache
Anjra
Beni Aros
Jbala
Ghmara
Sanhaja as-Srair
Rif
Kilometers

Fig. 2. Northern Morocco: tribal divisions.

R
The northern zone includes an area of about 20,000 square kilometers, roughly 131
one-tenth of Morocco. The maximum width of the zone, from the Strait of
Gibraltar to Wad Lukkus, is about 100 kilometers. The maximum length, from R
the Atlantic coast to Wad Moulouya, is about 340 kilometers. In 1950 the population 161
of the zone was estimated at one million, including 85,000 Europeans in 162
the Spanish protectorate, and another 150,000 Europeans in the cities of Tangier,
Ceuta, and Melilla.

TERRITORIAL DIVISIONS

R
631
Tribesmen of northern Morocco recognize three main confederations: Rif, Ghmara, 829
and Sanhaja as-Srair (fig. 2). Most tribesmen recognize also a territory known as
Jbala, the Arabic word for "mountains" or, in this case, "hills." There is no
traditional name for the area west of a line drawn through Arcila and Ksar R
al-Kebir. In the Rif, tribesmen of the Atlantic coastal area are described as 101
Igharbiyen (westerners). The Spanish referred to this area, approximately the 631
basin of Wad Lukkus, as "Lucus." The easternmost sector of the protectorate,
roughly the basin of Wad Kert, was known as Quert. The Moroccan government
retained this division until August, 1958, when the northern zone was reorganized
into larger territories.[1] In the discussion to follow, reference is made to the traditional
divisions, not to territories established in recent decades. R

The confederacy of Ghmara consists of nine tribes: Bani Bu Zra, Bani Mansur, 631
Bani Khalid, Bani Silman, Bani Siyyat, Bani Zejal, Bani Rzin, Bani Grir, and 619
Bani Smih. It is proper to use the prefix *bani*, Arabic for "sons of," since only a few [197]
villages in Bani Bu Zra and Bani Mansur retain Berber speech. According to 619
tradition, these tribes are descendants of the nine sons of an immigrant schoolmaster 173
named Aghmir.[2] Whether this explanation is historically accurate is unimportant.
The significant point is that the Ghmaran tribes have a sense of belonging
together through descent from a common, if perhaps hypothetical, ancestor.

S
The confederacy of Sanhaja as-Srair is formed of ten tribes: Ktama, Aith 619
Seddath, Bani Gmil, Aith Khannus, Taghzut, Aith Bu Nsar, Bani Bu Shibat, 831
Bani Hmid, Aith Bashir, and Zarqat. Here it is proper to use *aith*, Berber for [197]
"people of," since the tribes thus designated still speak Berber domestically. On
the southern slope of the Rif Mountains, in what used to be French Morocco, are
two other Sanhajan confederations, Sanhaja Ghaddu and Sanhaja Musbah, but
these groups no longer speak Berber and have little contact with the Sanhajans
of the northern zone.

R
The limits of the Rif are more difficult to trace. Many Moroccans apply this 101
term to the entire eastern half of the zone. Tribesmen living within the eastern 619
area are more restrictive. Bani Bu Frah and Bani Yittuft are usually regarded
as Rifian, although they have nearly lost Rifian speech. Mtiwa and Mistasa are
disclaimed by both Rifians and Ghmarans; they may be the descendants of immigrants
or exiles, for immigrant or exiled Rifians are found near Fez, at several R
locations in Jbala, and in the Oran department of Algeria. Targist presents a [197]
special problem: the cultural affiliation of this tribe has been obscured by the

---

[1] For further details see *L'Afrique Française*, November–December, 1958; and W. H. Lewis, "Rural Administration in Morocco," *Middle East Jour.*, 14 (1960), 45–60.

[2] J. Caro Baroja, *Estudios Mogrebíes* (Madrid: Instituto de Estudios Africanos, 1957), pp. 140–143.

R
101 presence of an influential family of *shurfa*, alleged descendants of the Prophet,
619 who encouraged a shift from Berber to Arabic speech. Rifian is spoken in the
~~197~~ hamlet of the Aith Azza, but the weekly market of Targist has functioned traditionally
S [443] as a trading center for the Sanhajan tribes, especially Zarqat. The Aith
[197] Mazduwi also appear to be of mixed origin, for both the Sanhajan and Rifian
dialects are spoken by this tribe.

R Sanhajans and Ghmarans generally regard all tribes to the east of them as
S Rifian, but among the Aith Bu Yihyi and other tribes of the Kert and Moulouya
619 valleys this appellation is restricted to the tribes of the basin of Wad Nkour. It
101 is useful to think of a zone of transition between the "true Rif"—Aith Wariyaghar,
Ibuqquyen, Aith Ammarth, Igzinnayen, Aith Tuzin, Thimsaman—and
the eastern frontier of the northern zone. The Ulad Stut are intrusive bedawin,
like the Khlut of the Atlantic littoral. The remaining tribes may be described
R as "eastern Rifians." Two minor confederations are recognized within this group.
[631] The first, "Iqar'ayen" in Rifian and "Gal'aya" in Arabic, includes five tribes:
Aith Bu Ifrur, Aith Sidar, Imazujen, Aith Bu Gafar, and Aith Shikar. The
second, called "Garet" or "Gart" in Arabic, is formed of Ibdharsen and Aith
R Bu Yihyi. The dialect of the Aith Iznasen is intelligible to most Rifians, but there
[197] seems to be general agreement that the Rif, even in a broad sense, does not extend
beyond Wad Moulouya.

Land and Livelihood

R In the total context of geography, northern Morocco should be described as an
133 isolated and generally inhospitable area. Moving from the Atlantic coast toward
the east, the traveler is confronted with an abrupt transition from alluvial plains
and terraces to a wild and chaotic zone of steep slopes and narrow ridges. The
eastern lowlands are more favorable from a physiographic point of view, but the
Rif chain creates a rain shadow, and the tribesmen of the eastern Rif, Garet, and
Gal'aya suffer from meager and erratic rainfall. Cut off to the south by the Rif
chain and to the north by inhospitable coasts, northern Morocco cannot compare
with Greece, Italy, southern France, or Andalusia as a breeding place for
advanced civilization. It is a rampart and a place of refuge.

R The tribesmen of northern Morocco share an agricultural heritage derived in
241 part from contacts with Phoenicians, Romans, Arabs, and Europeans. Farming
[197] methods are primitive, for the mountain tribes learned centuries ago how to grow
the maximum amount of food on tiny terraces, and the size of their fields and
the steepness of slopes discourage mechanization. Barley and wheat constitute
the most important crops. Wherever water is available for irrigation, the cereals,
which are dry-farmed, are supplemented by summer crops of maize, legumes, and
vegetables. Horticulture provides precious additional food, and during the spring,
R when cereal stocks are low, raisins, figs, and nuts are staples. In the semiarid low-
[243] lands east of the Rif chain, only cereal farming is possible, and famine may be
[731] experienced when rains are meager or arrive too late. The great seasonal mi-
[221] gration from this area toward the French farms of eastern Algeria resulted from
an imbalance between population and food supply.

R Variations in crop combinations and diet are partly conditioned by environ-
S mental factors, and hence will be considered in greater detail in chapter ii. A
241
182

R
S
182 few notes here will suffice to illustrate the range of difference. The Sanhajans are
[241] masters of terracing and irrigation, but in horticultural skill they yield to the
Rifians, who are noted also for honey and grapes. The Ulad Stut, thanks to
[234] their bedawin origin, are expert in the preparation of milk products. The
R
S
Ghmarans are northern Morocco's best fishermen, but their skill is limited to the
182 use of skiffs and seines. The Sanhajans are most interested in freshwater fishing,
226 and they may also be the best hunters in the northern zone. These points will be
[224] elaborated in chapter vi.

CULTURAL UNIFORMITY AND DIVERSITY

R In order to place northern Morocco in proper perspective, we must consider two
184 classes of culture traits: those that are ubiquitous and those that are limited to
171 certain parts of this zone. For example, the Rifian is in many respects quite different
from the Ghmaran or Jbalan. He speaks a different language, has different
ideas of honor and shame, wears his turban differently, and builds a different
type of house. Yet as Moroccans the Rifians, Ghmarans, and Jbalans share ideas
and objects that are rare or unknown in other parts of the Muslim world.

R All Moroccans, at least in theory, are good Muslims. Islam does not confine
771 itself to ideas and their influence on the spirit of man: it is a religion of force
182 and authority, a system of law, and a basis of government. The influence of
[771] Islam is evident in institutions and patterns of behavior that affect the form and
function of every village and farmstead. To say that Moroccans are Muslims
is to assert that they share ideas and institutions common to the entire Muslim
world. Yet it is also true that Islam in Morocco has many unusual features. It
is a common saying that Berber culture constitutes the foundation of the Moroccan
house, while Arab customs and religion are only the whitewash on the
walls.[3]

R A distinguishing feature of Moroccan Islam is the elaborate development of
779 brotherhoods and the cult of saints. These heterodox developments seem in part
795 to reflect pre-Islamic beliefs. The Berber tribesman, though he may be ignorant
of Arabic, yields to no one in the belief that he is pious and correct. He prays,
R keeps the fast of Ramadan, and honors those of his tribe who have made the
[776] pilgrimage to Mecca. In this sense he is like all Muslims, but, as Hart aptly
remarks, he retains local saints to comfort him and local jinns to plague and
R torment him.[4] One aspect of these beliefs is the superstition that relates to the
[778] sanctity of cemeteries and shrines. In chapter vii it will be shown that there
[128] is often a marked contrast between the plant cover of sacred land and that of
profane land.

R Berber kinship terminology, like that of the Arabs, is a bifurcate collateral
601 type.[5] The terms for mother's brother and for father's brother are different, as
R are the terms for mother's sister and for father's sister. The inheritance of property
428 follows the standard Maliki practice, which allots a share to each son equal
to that falling to two daughters. Descent is patrilineal, and the number of pa-

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R
[113] [3] D. M. Hart, "Morocco's Saints and Jinns," *Tomorrow*, 7 (1959), 45–54.

[4] *Ibid*, p. 46.

R
[113] [5] D. M. Hart, *Morocco: Subcontractor's Monograph* (New Haven: Human Relations Area Files, 1956), pp. 136a–140.

611 Descent is patrilineal, and the number of paternal relatives a Moroccan can remember is always greater than the number on the mother's side.[4]

565 184 The important details of social stratification show little variation within the northern zone. Real or alleged descendants of the Prophet constitute the highest class. Among tribesmen, the most respected and important class is composed of gentlemen farmers. At the bottom of the scale are blacksmiths, market weighers and criers, musicians and dancers, and tinkers or other itinerant artisans. The Jews, regardless of their profession, are lowest in the scale.

621 184 Besides these aspects of religion and social organization, there are many features of settlement and livelihood that show little variation within the northern zone. The basic unit of settlement is the hamlet or farmstead. Settlements of more than a few hundred inhabitants are rare. 241 433 [437] For every farmer who grows cash crops there are at least a hundred others who are concerned only with their own or community needs. In all Morocco, subsistence farming and barter govern rural economy, and trading takes place at weekly markets held in the open air.

[443] One of the clearest expressions of cultural diversity is the division of northern Morocco into zones of Arabic and Berber speech, a division which coincides with other cultural frontiers. Generally speaking, the eastern half of the area (Rif, Garet, Gal'aya) retains Berber speech, whereas the western half (Jbala, Ghmara) has been Arabized. The historical and cultural factors that have brought about this division will be considered in chapter iii.

175 631 648 A state, by minimum definition, is an extent of inhabited territory presided over by a government capable of asserting its authority. During most of its history, Morocco was hardly a state in this sense of the word. One of the important themes of Moroccan history is the division of the country into lands of government (*bilad al-makhzen*) and lands of dissidence (*bilad as-siba*). The belligerence of the free tribes was based not only on their hatred of taxes[5] and authoritarian order but also on their inability to conceive of any social or political unit larger than the tribe or confederation of tribes. Most of the Rif was part of the land of dissidence.[6] Jbala and Ghmara formed an intermediate zone, neither submissive nor openly rebellious in the face of domination from without. The plains of Wad Lukkus and the Gharb were easier to subdue.

619 628 [648] [571] [616] [712] Dissidence was expressed in intertribal and intratribal conflict as well as in opposition to the central government. In most of the Rif, and especially in Aith Wariyaghar, quarrels over ownership of land, water rights, and personal affronts led to blood feuds of extraordinary savagery. Some feuds did not end until one of the participating families was exterminated. Feuding and the necessity for defense gave rise to a complex system of alliances based in part upon moieties. In the days before the Spanish occupation, each house in Aith Wariyaghar had

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[4] In popular writings Berber society is sometimes described as being influenced by matriarchy. This assumption is based upon the fact that Berber women are much more active and unabashed than the Arabized women of the towns; it is based also upon the tradition that the Garmantians were led by a queen or prophetess. E.-F. Gautier, "The Monument of Tin Hanan in the Ahaggar," *Geog. Rev.*, 24 (1934), 439–443. [113]

[5] *Makhzen* comes from the verb *khazana*, "to lock up" or "to hoard." The word is synonymous with "government" and more especially with the treasury department. E. Michaux-Bellaire, "Makhzen," *Encyclopedia of Islam* (Leiden: E. J. Brill, 1913–1938). [113]

[6] Nevill Barbour, ed., *A Survey of North West Africa (the Maghrib)* (London and New York: Oxford University Press, 1959), pp. 380–381. [113]

a tower used as a lookout and blockhouse.[9] Conflict was most serious in the Rif, 619
where it was necessary to establish a system of women's markets so that the mem- 628
bers of feuding cantons or tribes could carry on a rudimentary trade. Another [912]
indication of the varying degrees of dissidence is the scale of fines imposed by [443]
customary law. The fine imposed for murder by the Aith Wariyaghar was four 681
times as large as the fine for the same crime among the more pacific Sanhajan 171
tribes.[10] In the laws of the Aith Seddath there is no mention of house-burning, a 691
frequent occurrence in the Rif. [682]

In the days before the European occupation the division between government 642
and dissidence coincided with a division between authoritarian order and repre-
sentative councils. This division might be described also as a contrast between
Arab and Berber systems of government. The Berber system was based upon [623]
superimposed councils. The smallest was the council of a village or a number of
scattered farmsteads. The second council, called the "council of the great," had [634]
jurisdiction over a canton. At least one and sometimes all members of the second [619]
council participated in the deliberations of a tribal council. The system was demo-
cratic, with rotation of authority; thus no one could gain excessive power. The
Arab system was and is quite different, for authority rests with individuals,
from the *qaid* who rules the tribe to the *shaikh* or *muqaddam* who rules the vil-
lage or hamlet.

Of the many ceremonies that influence an individual's life, marriage is by far 585
the most important. Here again there are marked differences from one area to [184]
another. In the Rif the wedding celebration lasts seven days; on the first four
days, private feasts are held for the families involved; on the last three days,
guests are invited to the feasts. In Jbala, Ghmara, and most of Sanhaja as-Srair [184]
the wedding celebration lasts only three nights. Other differences appear in the [171]
entertainment offered to the guests and the complicated rules that govern the
behavior of the bride and groom.[11] 764

The other crises in the life of an individual—naming, the first haircut, and 184
circumcision—vary correspondingly, as do the procedures related to death and 171
burial. When a corpse is ready for burial in the Rif, it is carried on the door of [852]
the local mosque, and virtually the whole community turns out for the proces- [553]
sion and funeral. In the Arabized sector of northern Morocco the body is usually [304]
carried by paid pallbearers, and only the immediate family may attend the burial.
Among the Aith Bu Yihyi and Ulad Stut it is standard practice to carry the [492]
dead to the burial place on the back of a donkey or mule.[12]

The number of material traits that can be used as a basis for cultural dif- 415
ferentiation is almost unlimited. Containers of skin and iron in Garet contrast 189
with pottery in the Rif, and wooden vessels in Sanhaja as-Srair. Even within the [171]
Rif one may distinguish the handmade pottery in Igzinnayen, Aith Ammarth,

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[9] Most of the towers were removed in 1922 by order of Abd al-Krim. D. M. Hart, "An Ethnographic Survey of the Riffian Tribe of Aith Wuryaghil," *Tamuda*, Revista de Investigaciones Marroquíes, 2 (1954), 38.

[10] For further information on customary law in the Rif, see E. Blanco Izaga, *El Rif: la ley rifeña* (Ceuta: Imprenta Imperio, 1939), pp. 71–75.

[11] Edward Westermarck, *Marriage Ceremonies in Morocco* (London: Macmillan and Co., Ltd., 1914).

[12] C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931), 143–145.

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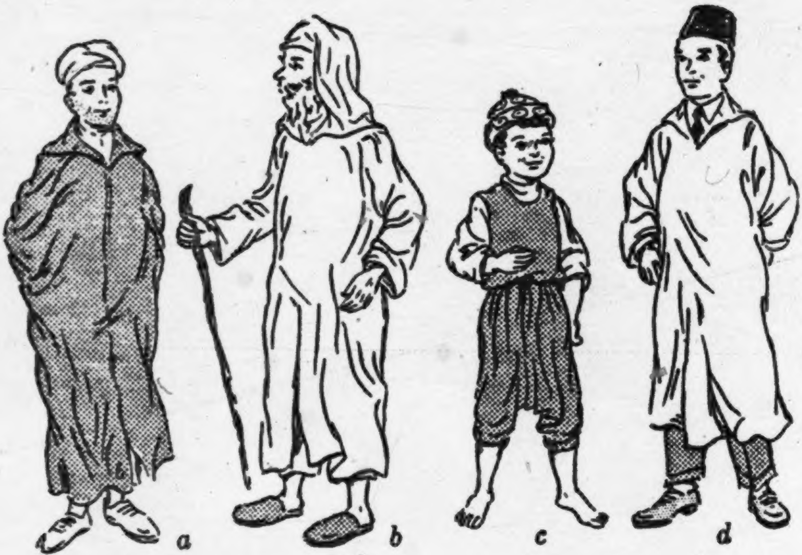

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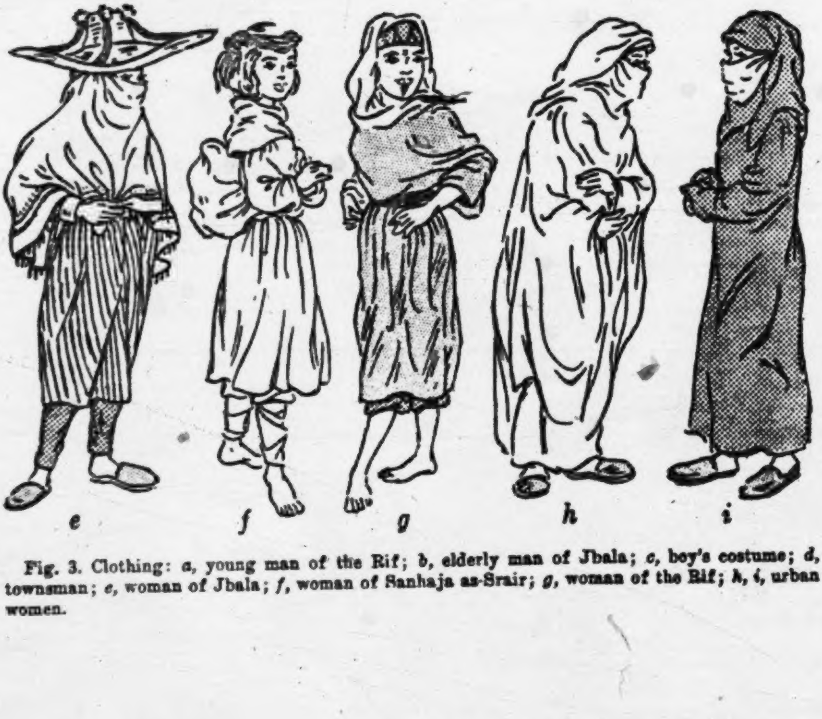

Fig. 3. Clothing: *a*, young man of the Rif; *b*, elderly man of Jbala; *c*, boy's costume; *d*, townsman; *e*, woman of Jbala; *f*, woman of Sanhaja as-Srair; *g*, woman of the Rif; *h*, *i*, urban women.

R
and Aith Wariyaghar, and the wheel-made pottery in Ibuqquyen, Aith Tuzin, 415
and Thimsaman. Basketry is made by coiling, twilling, and wickerwork. In the 184
R
manufacture of woolen textiles two types of loom are employed: in most of the 286
northern zone an upright two-bar loom with stick heddle is used; another type of 184
loom is a horizontal mechanism, with looped wire heddles, operated by a treadle. 171
In Garet, long braids of alfa grass are tied to stakes to form a crude loom for
weaving textiles.

R
Differences in types of houses and in settlement patterns provide further evi- 342
dence of cultural diversity. Jbala, Gharma, and Sanhaja as-Srair represent one 184
tradition, while the Rif, Garet, and Gal'aya represent another. The sharp divi- 171
sion between sloping roofs in the western half of the zone and flat roofs in the
area east of Targist (see chap. v) coincides with the difference in settlement
pattern between the hamlets of the west and the scattered farmsteads of the east.

R
In Morocco, as in most of the Muslim world, it is easy to distinguish between 291
the clothing of townspeople and that of rural folk. The sophisticated townsman 369
(fig. 3, *d*), with gabardine suit, European shoes, fez, and dark glasses is never
mistaken for a man of the country (*bilad*). Urban and rural differences in
women's dress are even more pronounced. The shrouded figures seen in the cities
(fig. 3, *h*, *i*) contrast sharply with the unabashed women of the countryside.[13]
Men and women of the bilad are promptly identified when they enter a town.
R
From which bilad do they come? A generation ago, before the adoption of cotton [178]
cloth and other imported fabrics, this question was easy to answer. Garments
were then made entirely of wool, locally sheared, spun, and woven, and each
costume betrayed a provincial style. Today this distinction is not always clear;
yet it is still possible to learn much about where a man comes from by the length
and cut of his clothing, the way he ties his turban, and the nature of his footgear.
Women's dress is even more explicit.

R
The basic garment of most tribesmen is a hooded cloak (*jillaba*). We can be 291
sure that this garment was worn in the sixteenth century, for Leo Africanus 175
describes Moroccans as being "clad in certain woolen cloaks or mantles, such as
are used in Italy." "These mantles," he adds, "have certain hoods, which cover
J
their heads and visages, so that you can scarce discern them to be men."[14] In Jbala R
and Ghmara, cloaks are knee-length, and there is no transition from hood to sleeves. 291
R
The front of the Jbalan cloak usually has tufting or some other decoration. A
generation ago this type of garment was worn in the Rif also, but today most [178]
Rifians wear a longer cloak, reaching halfway between knee and ankle. Rifian
cloaks are no longer decorated, and most of them have definite shoulders (fig. 3, *a*).
R
Throughout northern Morocco, brown is the preferred color for cloaks, but gentle- 291
men of distinction occasionally wear white (fig. 3, *b*). One sometimes sees a gray 822
or blue cotton jillaba and even a few of striped pattern, but such apparel is worn 171
only by tribesmen who are more or less urbanized. [369]

R
Cotton turbans (*rezza*) are the characteristic headgear. In the Rif, turbans 291
are worn straight, two fingers above the eyebrows, and are always white. This 171

R
[13] Ernst Rackow, *El traje musulmán femenino en Africa del Norte* (Madrid: Instituto de Estudios Africanos, 1953); and *Beiträge zur Kenntnis der materiellen Kultur Nordwest-Marokkos: Wohnraum, Hausrat, Kostüm* (Wiesbaden: Otto Harrassowitz, 1958). [113]

[14] Leo Africanus, *The History and Description of Africa* (London: Hakluyt Society, 1896), II, 526. First edition, Venice, 1550.

R 291 171 style is preferred by the Sanhajans also. The Jbalans place turbans farther back on the head, and often use colored cloth. Boys, everywhere in Morocco, wear a crocheted skullcap (*tagiya*) (fig. 3, *c*).

R 291 177 The most important undergarment is a pair of baggy cotton trousers (*serwal*) that reach to a little below the knees (fig. 3, *c*). The second undergarment, a high-necked shirt, is now being replaced by European shirts. It is always possible to find European apparel, especially parts of French and Spanish uniforms. In rural areas the transition has been from draped clothing of homespun wool to tailored garments, and then to European trousers, shirts, and jackets. European clothing is not always conspicuous, for the jillaba covers most of the body and is seldom removed.

R 291 178 [824] [292] [177] Footgear was once a good index of tribal affiliation. Many Rifians still wear toe-strap sandals of palmetto fiber (*Chamaerops humilis*) or cross-strap sandals of alfa grass (*Stipa tenacissima*). A generation ago, Rifians also made clogs and stilts for use during the rainy season. When traditional footgear is given up, the change is usually to canvas sneakers or leather shoes, both imported from Europe (fig. 3, *a*, *d*). R 291 171 The leather slippers (*bilga*) now common in Jbala and Ghmara are not yet fully accepted in the Rif. The one advantage of this type of shoe is that it can be shed quickly at doorways. In Sanhaja as-Srair, buskins made of cloth wrapping, with cowhide or goatskin soles, are worn as galoshes.

R 178 481 293 415 Such apparel is usually worn without decoration or embellishment. Canes are popular, especially among older men, and occasionally an umbrella may be seen, but the powder horns, daggers, and leather bags, once indicative of a well-dressed man, are no longer worn. R 415 Powder horns disappeared with the introduction of cartridges and the extermination of the aoudad, or wild mountain sheep (*Ammotragus lervia*). The old-style scrip, with shoulder strap, was used to store [531] [178] powder, lead balls, and emergency rations. It was decorated with silk embroidery or inlaid with colored leather, and had long fringes and tassels. A generation ago, bags of this sort were a reliable indication of tribal affiliation. Today they are made only by craftsmen of Taghzut, who also produce handbags, watchbands, belts, and wallets for the tourist trade.

R 291 178 [177] Like men's clothing, women's clothes were once made entirely of wool. The principal garment was a long strip of woolen cloth, wrapped around the body and fastened by a belt and pins or clasps. When cotton was introduced, women's garments lost their simple form and became tailored. J R S 291 [531] The result was a different and more decorative costume. Jbalan and Ghmaran women dress very much alike, but with different color combinations. The women of Ghmara and Sanhaja as-Srair wear skirts of plain white; the Jbalan women prefer red and white stripes (fig. 3, *e* and *f*). Ghmaran and Sanhajan women wear leggings of cotton cloth bound with threads of goat hair, while the Jbalan women wear leggings of leather. The Jbalan women, particularly on market and festival days, wear huge and highly decorated straw hats (fig. 3, *e*). R S [854] Countrywomen never wear veils; when modesty is required they can cover their faces with shawls or head towels. A distinctive feature of woman's dress in Ghmara and Sanhaja as-Srair is a width of cotton cloth, wound about the neck and waist, by means of which an infant can be carried, or food and other objects (fig. 3, *f*).

291 Rifian women present a different picture (fig. 3, *g*). They never wear leggings
[177] and are almost always barefoot. Sneakers may be worn on special occasions, but one never sees slippers. In recent years the Rifian markets have been flooded with inexpensive rubber shoes, usually green in color, which some of the younger women have adopted.

Brilliant colors characterize the Rifian woman's outer robe, which is usually
[531] of red or yellow silk, worn over an inner robe of white cotton. Rifian women have recently begun to wear baggy trousers, usually blue. Unmarried girls wear a wide cotton headband with brightly colored embroidery, which is partly covered by
[177] a head towel. Married women in the mountains of Aith Tuzin and Aith Wariyaghar, and both married and single women in Sanhaja as-Srair, wear strands of black yarn around the crown of the head (fig. 3, *f*). One of the distinctive features of Rifian dress is a red woolen belt introduced about a generation ago
[171] from Melilla. It is worn by most Rifian women, but has not been adopted in
[184] Ghmara or Sanhaja as-Srair. In summer many Rifian women wear straw hats, but they do not approximate the huge size of the Jbalan "sombreros."

In general, there is a distinct difference in the pattern of women's dress in the
[184] Rif and in the western provinces. The brilliant yellow and red robes of the Rifian
[171] women are in striking contrast to the somber garments of Ghmara and Sanhaja as-Srair. These differences coincide with other cultural frontiers. The human geography of northern Morocco is a complicated pattern of areal succession and overlap; yet many lines coincide, and it is possible to speak of "culture areas."

CHAPTER II

ENVIRONMENT

133 MOST of northern Morocco is mountainous. The dominant surface feature is the Rif mountain chain, which curves in a great arc from the Strait of Gibraltar to the hills of Aith Said.[1] The main artery of east-west traffic in Morocco is the Taza corridor, south of the Rif chain (fig. 1).[A] The important north-south routes run along the Atlantic coast or follow the valley of Wad Moulouya. Innumerable ridges lead to the Mediterranean, but that coast has few beaches and little shelter. The exposed and straight Atlantic coast is even more hostile to maritime life. Enclosed within the bounds of a rugged mountain range and inhospitable coasts, most of northern Morocco is isolated. The narrow valleys and ridges of the Rif chain "form a secluded mountain region, difficult of access, which at all times enabled its Berber inhabitants to keep their necks free of foreign yoke."[2]

THE RIF CHAIN

The Rif chain consists of a series of arcs, pierced by gorges trending at right angles to the main structural lines (fig. 4).[B] The northern versants of these arcs have undergone extreme dissection. Streams fed by heavy rainfall have cut deep canyons, and most interfluves are narrow, knifelike ridges. The overlapping folds of this chain are similar to those of the alpine mountains in Europe, notably the Sierra Nevada, with which the Rif was joined in early Tertiary time.[3]

Geologists divide the Rif into three zones (fig. 5):[C]

1. A zone of metamorphic rocks, mainly of Paleozoic age, flanks the coast from Ceuta to Puerto Capaz. This zone constitutes the southern flank of the Betico-Rifian massif, which was broken into two segments when the Strait of Gibraltar was formed. Although countless navigators have viewed this coast, it is scientifically one of the least-known segments of the Mediterranean littoral.

2. A zone of calcareous rocks is mostly of Tertiary age. Its terminal point is Jbil Musa, one of the Pillars of Hercules. From Jbil Musa a high wall of limestone runs southeastward to Shawen, curves to the sea, and then reappears as the Karstic highland of Ibuqquyen. Several peaks exceed 1,000 meters in elevation, and Jbil Tisuka and Jbil Leshab are slightly more than 2,000 meters high. The structural break at Tetuán is the only gap in the wall. The gorge cut by the antecedent Wad Lao is too narrow to be used as a trade route. Most of this range is a formidable barrier.

3. A broad zone of younger sedimentary rocks is schistose for the most part, but includes some strata of sandstone. The formation name "Flysch" has been

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[1] "Rif" is used here in the popular sense to refer to the mountainous area of northern Morocco. In Maghribi Arabic *er-rif* means a fertile or cultivated zone on the banks of a river, along a coast, or on the edge of a desert. It can be translated also as "margin" or "fringe."

[113]

[2] Theobald Fischer, "Marokko: eine länderkundliche Skizze," *Geog. Zeitschr.*, 9 (1903), 67.

[3] The best geological map of northern Morocco is the *Bosquejo geológico de la zona del protectorado español* (Madrid: Comisión de Estudios Geológicos, 1952). Brief accounts of the physical geography of the area appear in "Maroc septentrional," *Livret-guide des excursions A 31 et C 31, Congrès Géologique International* (Rabat, 1952); Horst Mensching, *Marokko: die Landschaften im Maghreb* (Heidelberg: Keyersche Verlagsbuchhandlung, 1957), pp. 148–154; and G. Maurer, "Les pays rifains et prérifains," *L'Information Géographique*, 23 (1959), 164–171.

A, B, C, [See pp. 1, 14-15 respectively--Analyst] applied to this zone, which includes northern Morocco's highest mountains and 133 principal watershed.[7] Adrar[8] Tidighin, highest of the Sanhajan mountains, rises to 2,456 meters and is snow-capped during six months of the year (plate 1, *b*).

MARGINS OF THE RIF CHAIN

From Bab Taza northward the karstic mountains of Bani Hassan form the principal arc of the Rif chain. West of this range the highland complex consists of a series of outliers trending northwest to southeast. Several of these ridges are more than 1,000 meters in elevation, and the highest peaks, Jbil Sugna and Jbil Buhashim, exceed 1,500 meters. A line drawn from Tangier to a point about 30 kilometers east of Ksar al-Kebir marks the division between the Rif highlands and the hills and terraces of the Atlantic littoral.[9]

The eastern margin of the Rif highlands is difficult to delimit. The main arc extends to a point about halfway between Alhucemas and Melilla. Mountainous terrain is found farther to the east, but its structure and lithology are different. The Rif chain is composed almost entirely of sedimentary and metamorphic rocks. Volcanism is evident from the eastern edge of the Nkour Valley to the Algerian frontier. The largest volcanic feature is Adrar Gurugú (886 meters), a composite cone of basalt and andesite behind Melilla. A number of smaller cones dot the plains of Garet and Gal'aya, and the promontories at the bay of Alhucemas and the Melilla peninsula are formed of trachyte and andesite. A large part of Gal'aya and Garet was submerged in Tertiary time. This lowland area includes the flattish plains of recent alluvium extending inland from Nador, and hill sections formed by recent stream dissection of Tertiary and Pleistocene sediments. The small range of Ikibdhanen appears to be an anticline. This range and the Kar-Kar highland were formed prior to the period of Rifian orogeny.

THE THREE COASTS

Most of northern Morocco is isolated by the Rif mountains and the inhospitable Mediterranean coast. The Atlantic façade, even more hostile to maritime life, has been the country's best rampart. Since these two shores are of little value, the coast facing Gibraltar has played a preponderant role.

Straight and shelterless, the Atlantic façade is indented only by mediocre har- [504] bors and poor estuaries. A series of marine terraces, mostly of Pliocene or Miocene age, dominates the littoral from Arcila to Larache. Quaternary dunes line the coast from Larache to and beyond the old interzonal frontier. The plain of Wad (134) Lukkus is the largest zone of alluvial soil on the Atlantic coast and the only area in northern Morocco where agriculture is almost entirely mechanized. The small coastal plain on the frontier between the former Spanish and international zones is poorly drained and swampy most of the year.

Cliffs of Cretaceous or Eocene sandstone line the Strait of Gibraltar from Cape

[TEXT CONTINUED ON PAGE 17]

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[7] The best description of this area appears in the log of the excursion sponsored by the Société de Géographie du Maroc in March, 1957; see *Notes Marocaines*, 9–10 (1957), 43–46. (113)

[8] I use the Berber *adrar* rather than the Moroccan Arabic *jbil* because this peak is in an area of Berber speech.

[9] I am omitting the pre-Rifian foothill zone, immediately south of the area shown on the maps. (113) For a description of that zone see Maurer, *op. cit.*, and Jean Dresch, *Essai sur l'évolution du relief dans la région prérifaine* (Paris: Larose, 1933).

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2
Senhaja MX4

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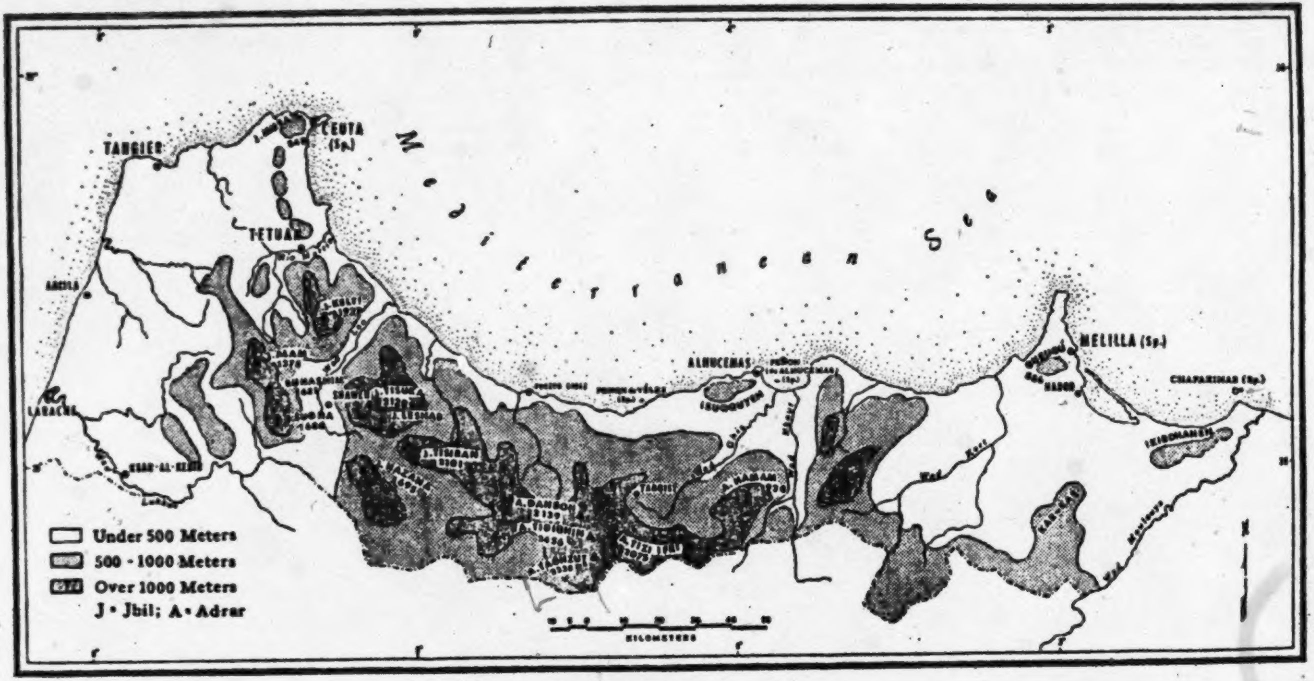
Mediterranean Sea
TANGIER
CEUTA (Sp.)
TETUAN
ARCILA
LARACHE
KSAR-AL-KEBIR
ALHUCEMAS
PEÑON DE ALHUCEMAS (Sp.)
MELILLA (Sp.)
NADOR
CHAFARINAS (Sp.)
TARGIST
Wad Kert
Wad Moulouya
J. TIMRAN
KILOMETERS
Under 500 Meters
500 - 1000 Meters
Over 1000 Meters
J = Jbil; A = Adrar

Fig. 4. Northern Morocco: relief.

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

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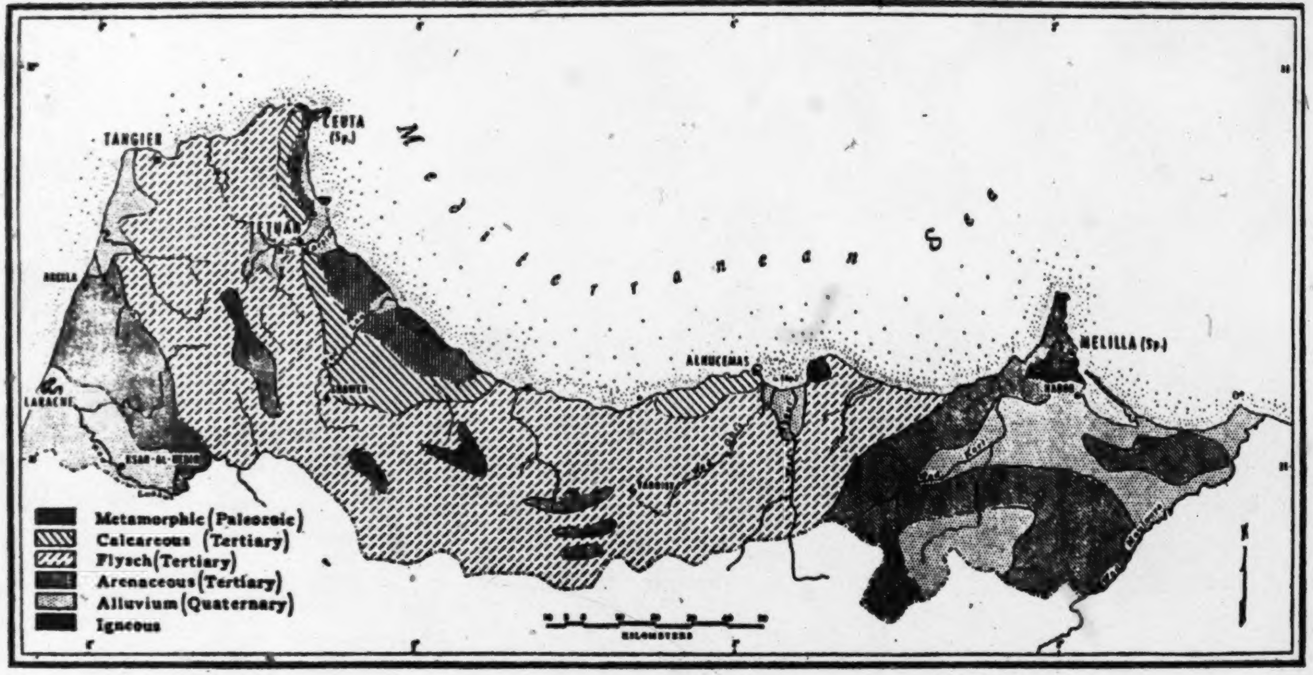
TANGIER
CEUTA (Sp.)
TETUAN
ARCILA
LARACHE
KSAR-AL-KEBIR
CHAOUEN
Mediterranean Sea
ALHUCEMAS
MELILLA (Sp.)
NADOR
KILOMETERS
N
Metamorphic (Paleozoic)
Calcareous (Tertiary)
Flysch (Tertiary)
Arenaceous (Tertiary)
Alluvium (Quaternary)
Igneous

Fig. 5. Northern Morocco: surface geology.

/p. 15/

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

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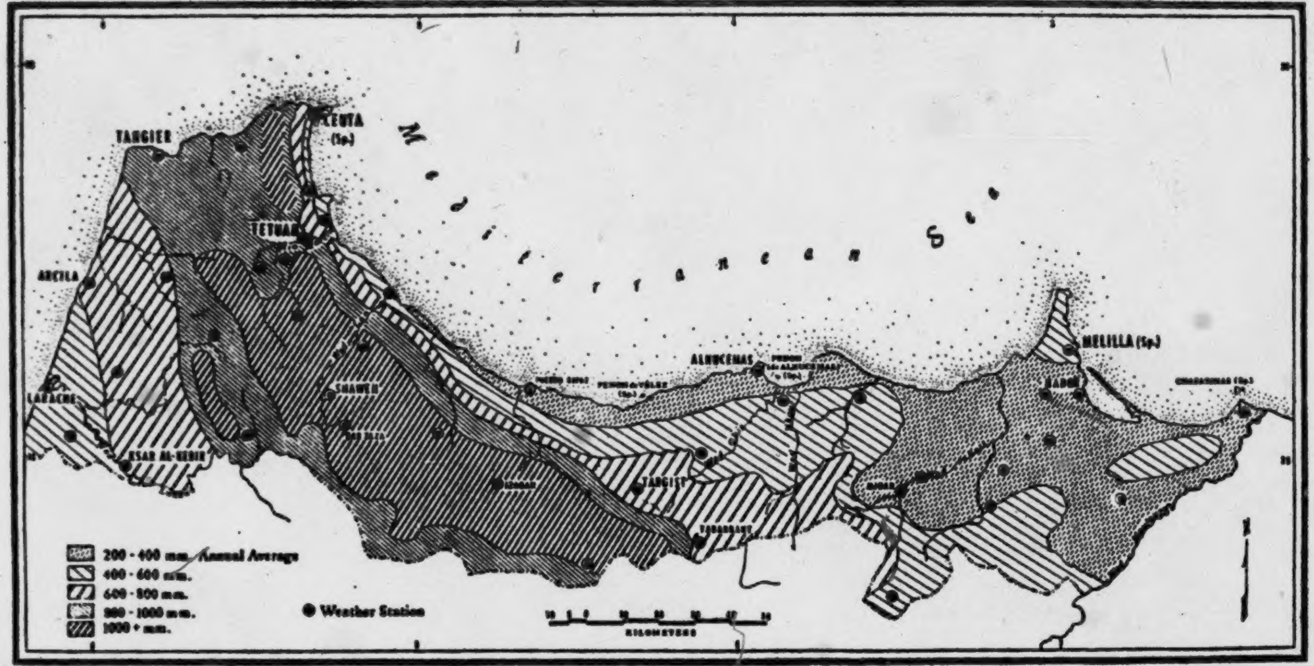

TANGIER
CEUTA (Sp.)
TETUAN
ARCILA
LARACHE
KSAR AL-KEBIR
SHAWEN
Mediterranean Sea
ALHUCEMAS
MELILLA (Sp.)
NADOR
TARGIST
200 - 400 mm. Annual Average
400 - 600 mm.
600 - 800 mm.
800 - 1000 mm.
1000 + mm.
● Weather Station
KILOMETERS

Fig. 6. Northern Morocco: precipitation, 1944–1955.

133 133 175 Spartel as far as the western flank of Jbil Musa. Today this coast commands one of the world's great trade routes. For the Ancients the Pillars of Hercules marked the end of the known world, the very limits of civilization. In medieval time the Arabs rarely ventured into the Atlantic, and in the great age of exploration the Occidental Muslims limited their activity to piracy. For Morocco this coast has been a bond with Spain. By this almost terrestrial function the Strait of Gibraltar assumed a decisive role in Moroccan history. It was to guard the southern flank of Betica that Emperor Claudius created the province of Mauritania Tingitana in A.D. 46. The proximity of the two shores allowed Islam to conquer the Iberian peninsula, and the Spanish, in turn, to extend their influence to the Moroccan coast.

133 [504] [487] [491] On the Mediterranean coast Morocco faces the great highway of civilization, but that shore, almost completely devoid of shelter, has never had an important maritime activity. A few fishing boats operate on calm days, but their sole function is to carry nets and seines a short distance beyond the surf. No road or trail of any significance follows this coast. Immediately east of the delta of Río Martín (Wad Martil) the coastline consists of a series of high cliffs cut by deep barrancas (pl. 1, *a*). This pattern, except for the small coastal plain formed by the deltas of Wad Ghis and Wad Nkour, continues as far as Melilla.

CLIMATE

132 The climate of northern Morocco is of the Mediterranean type. In its simplest form this type of climate is characterized by (1) concentration of precipitation in winter and spring, the summers being nearly or completely dry; (2) warm to hot summers and mild winters; and (3) a high percentage of the possible sunshine for the year. [243] [312] From the Atlantic coast eastward to about 4° west longitude, irrigation is unnecessary for cereal crops. Within this zone the average annual precipitation ranges from 400 mm. to more than 1,000 mm. The extent of this range reflects the extreme contrasts of exposure and elevation. The drier zone, with precipitation totals of 400 mm. or less, begins on the eastern edge of the Rif chain.

[127] Figure 6 was compiled from published records of forty-five weather stations for the decade 1946–1955. The former date is the earliest that can be used if conditions in the entire zone are to be compared. The records of a few stations extend to earlier years, and the Catholic Mission in Tangier has recorded weather observations since 1912. But data have become available for the interior of the zone only since the end of the Second World War.[1]

Precipitation decreases from north to south on the Atlantic coast, and from west to east on the Mediterranean coast. Tangier, with 810 mm. (31.9 in.), is the wettest coastal station in the zone. At Arcila, only 40 km. to the south, the total is 611 mm. (24 in.). On the Mediterranean coast, Ceuta with 560 mm. (22 in.) contrasts with Wad Lao with 460 mm. (18.1 in.), Puerto Capaz with 330 mm.

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[113] [1] For observations recorded prior to 1944, see *Resumen de las observaciones meteorológicas efectuadas en la zona de Marruecos hasta 1944* (Tetuán: Imprenta del Majzen, 1946). The years 1944–1946 are covered in a supplement published in 1947. Since the latter date, weather records have been published monthly in the *Boletín Mensual Climatológico del Servicio Meteorológico en Marruecos* (Tetuán: Imprenta del Majzen). For data on precipitation elsewhere in Morocco see *Atlas du Maroc*, Planche 4 *a*, "Précipitations annuelles" (Rabat: Comité de Géographie du Maroc, 1958), and the "Notice explicative" that accompanies the map.

132 (12.9 in.), and Alhucemas with 315 mm. (12.4 in.). The area of heaviest precipitation runs along the line of the Rif chain. Because of the orographic mechanism, highland areas receive more precipitation than adjacent lowlands. No records exist for the highest altitudes, but annual rainfalls totaling more than 1,500 mm. (59 in.) may be surmised. The amount recorded at Bab Taza—1,315 mm. (51.7 in.)—suggests very heavy precipitation on Jbil Tisuka and Jbil Leshab. In the Sanhajan highlands, Izagan, at an elevation of 1,500 meters, has 1,414 mm. (56.6 in.) and Tabarrant, at 1,140 meters, has 1,199 mm. (47.2 in.) of precipitation. On the highest peaks of the Sanhajan highlands the rainfall may average 2,000 mm. per year. In areas higher than 1,500 meters some snow falls during the winter months. Peaks above 2,000 meters are snow-capped from the middle of November to the end of May.

The rainy season begins at about the same time throughout northern Morocco, but the amount of precipitation varies notably. The meridian running through Targist marks the division between the wetter and drier parts of the northern zone. Targist receives 423 mm. (16.6 in.) of precipitation. At Midar, 65 km. farther to the east, the total is only 281 mm. (11 in.). At Melilla the precipitation is 414 mm. (16.2 in.), but no other station in the eastern lowlands regularly records more than 350 mm. (13.8 in.). The sharp decrease in amount of precipitation east of the Sanhajan highlands is one of the striking aspects of the geography of northern Morocco.

Annual variability in amount of precipitation is characteristic of all stations, regardless of whether the total is large or small. In the decade 1946–1955, precipitation at Arcila varied from 418 mm. (16.4 in.) to 850 mm. (33.5 in.); at Alhucemas the corresponding totals were 216 mm. (8.5 in.) and 430 mm. (16.9 in.). Variation of this magnitude is most noticeable in the drier eastern lowlands, where livelihood is based upon dry farming of cereals. During the same decade, annual precipitation at Midar varied from 105 mm. (4.1 in.) to 450 mm. (17.7 in.). The former year (1947) was one of great hardship, whereas the latter year (1955) was bountiful. The range of variation was just as large at Arcila, but the 1947 rainfall of 416 mm. (16.4 in.) did not mean failure of the cereal crop.

No part of this zone is more than 100 km. from the coast. Since marine temperatures tend to be relatively mild and to change but little from summer to winter, a corresponding mildness is characteristic of all areas into which sea air is regularly carried. Temperatures below freezing or above 35°C. (95°F.) are rare in the Atlantic coastal zone. The Mediterranean coast, because of the warmer water of the inland sea, is somewhat milder throughout the year than the Atlantic coast, which is affected by the cool Canaries Current. The highest summer temperatures are experienced in the Moulouya Valley, which is sheltered from marine air. In the mountains the highest summer temperatures occur on south-facing slopes, where temperatures may rise above 35°C. even at an altitude of 1,000 meters. Freezing temperatures are common at the same elevation during the winter months. It seems reasonable to suppose that winter temperatures may drop to -10°C. at an altitude of 2,000 meters.

Drainage

132 Drainage basins are small in this area, for the watershed is close to the sea. The
133 seasonal rate of flow follows the seasonal rainfall, but with a lag in time that
varies with the slope, the vegetation, and the permeability of the rock. Spate follows rainfall where impermeable rocks form the basin, more slowly where the basin is of permeable limestone. All the Mediterranean streams may be roaring torrents at some period from October to May; but most of them dry up during the long summer drought. The valleys of some of the larger streams, like the Ghis and Nkour, betray their Mediterranean regimen by a double bed: in summer a narrow channel is cut below the broad rocky shelf which is the winter bed. Wad Ouergha draws off most of the drainage from the Sanhajan highlands; it is the largest stream flowing from the Rif chain, and one of the sources of irrigation water in the Gharb coastal plain (fig. 1). The basin of Wad Lukkus includes most of the Atlantic drainage. Surface streams are rare in the calcareous zone. The only stream that flows through the limestone mountains is the Wad Lao, which follows an antecedent course; but Wad Hajara, Wad Khemis, and Río Martín (Wad Martil) are fed by springs issuing from the base of this range. The area between Wad Nkour and Wad Moulouya has only one large stream, Wad Kert, and it receives little nourishment after it leaves the highlands. Wad Moulouya, from the distant Ayache Mountains of the High Atlas, is northern Morocco's great exotic stream. This stream and Wad Lukkus constituted the only natural segments of the boundary between French Morocco and Spanish Morocco.

Plant Domains

137 The vegetation of North Africa can be divided into (1) a Mediterranean domain,
where forest and shrubs predominate; (2) a domain of "steppe," where forest
is confined to highland enclaves in the midst of a predominant cover of grass
and herbs; and (3) a domain of highland vegetation, which includes a subalpine
formation with some trees and, only in the Moroccan Atlas, an alpine formation
[132] without trees. Saharan vegetation penetrates Barbary at only two points: in the
Hodna basin of Algeria and on the plains extending inland from the Gulf of Gabès in Tunisia. Figuig, Ksar as-Suq, Zagora, and Goulimine, all within the political limits of Morocco, receive less than 200 mm. of precipitation per year, but the records of these stations do not show the variability indicative of true desert. The Moroccan territory south of the Atlas chains forms part of the "pre-Sahara" of French terminology.[*]

In terms of this classification, all but a small part of northern Morocco falls within the Mediterranean domain. No peak in the Rif Mountains rises above timberline, and only a small area can be called subalpine. Grassland is confined to one area on the eastern edge of the zone. This area, in the lower Moulouya Valley, is one of the driest parts of northern Morocco, but it is not certain that the presence of steppe vegetation can be attributed solely to meager precipitation. The dominant species is *Stipa tenacissima* (Arabic *alfa*). This hard tussock grass

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[113] [*] For a brief description of vegetation in all North Africa, see Jean Despois, *L'Afrique du Nord* (Paris: Presses Universitaires de France, 1949), pp. 80–96; and Louis Emberger, "L'Afrique du Nord-Ouest," *Unesco Arid Zone Research*, VI, "Plant Ecology" (Reviews of Research) (Paris, 1955), pp. 219–249.

137 has deep roots, forms strong clumps, and its awns stick to the coats of passing animals. More important, it is palatable only for a brief period in spring.[8] Alfa grass is scattered over most of Garet, but is conspicuous only in the area between the hills of Ikbdhanen and Kar-Kar.

Forest, Maqui, Garrigue

137 132 The climate that has prevailed during historic time is such that trees ought to dominate the vegetation of this zone. As figure 7 indicates, *Pistacia atlantica,* *P. lentiscus, Quercus Ilex, Pinus halepensis, Callitris articulata, Rhus pentaphylla,* and *Zizyphus lotus* can grow in the semiarid sector of northeastern Morocco. The altitudinal range of at least three and possibly eight trees extends above the highest peaks of the Rif chain (table 1). Edaphic factors impose some limitations. The cork oak will not grow on calcareous soils, and most forest species are excluded from poorly drained alluvium. Nevertheless, areas that are barren of trees as a result of natural causes constitute only a small part of this zone.

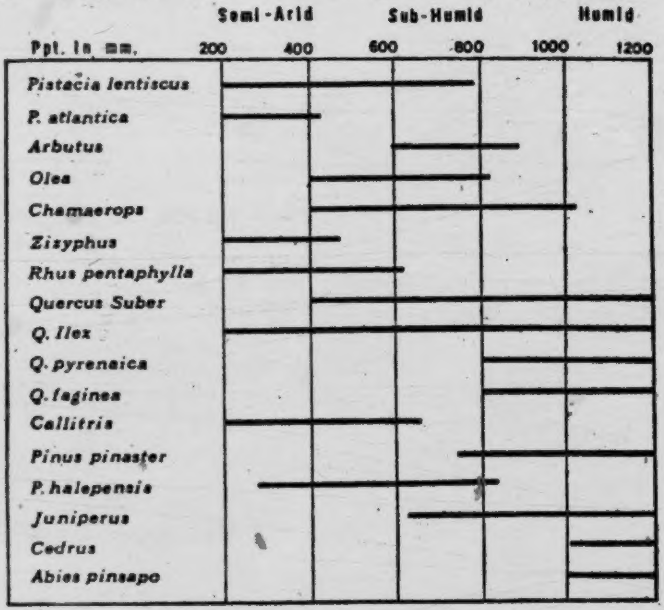

Fig. 7. Range of forest species according to average annual precipitation.

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Most of the forest species common in northern Morocco are endemic to the Mediterranean region; a few belong more specifically to the western province of that region. *Quercus coccifera, Quercus Ilex, Pinus halepensis, Arbutus Unedo,* and a number of prominent Moroccan shrubs are spontaneous in most of the

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[113] [8] Charles Killian, "Plantes fourragères-types des hautes-plaines algériennes," *Annales de l'Amélioration des Plantes,* 4 (1954), 505–527.

137 Mediterranean lands. The natural range of *Pinus pinaster, Chamaerops humilis,* and *Quercus Suber* extends to Sicily and the western versant of Italy, but not to Greece, Turkey, or Lebanon.[30] As typical elements of Mediterranean vegetation, these plants are provided with mechanisms of defense against excessive transpiration during the long summer drought. The trunks of most trees are incased in a thick, deeply fissured bark; leaves are thick and leathery, and have hard, shiny surfaces. Under normal conditions few of the Moroccan trees cast deep shade; so the understory is usually well developed.

This shrubby undergrowth of bushes and small trees may form a dense thicket, but is more often degraded by burning, cutting, or browsing. There are many names for it: in Greek *longos*, in Spanish *monte bajo* or *matorral*, in Italian *macchia*, while we have adopted the Corsican—and French—*maqui(s)*. It is a mixed association of evergreen plants, with tough and twisted wood, brilliant and often scented flowers, and shiny or glaucous foliage. Where degradation has been severe, the maqui ceases to form a closed canopy. This type of rather stunted and open vegetation, known in France as *garrigue*—from *garoulia*, the Provençal name for *Quercus coccifera*—is marked by a wealth of aromatic Labiatae, Cistaceae, and Rutaceae, which sprout and germinate quickly after fires. All these plants, whether maqui or garrigue, are heliophilous and many of them are thorny. In chapter vii it will be demonstrated that garrigue constitutes a degraded form of maqui, and maqui a degraded type of forest.

TABLE 1

ALTITUDINAL LIMITS OF SOME MOROCCAN TREES

Species	Elevation (meters)	Location
Rhus pentaphylla	1,000?	Rif?
Zizyphus lotus	1,000?	Middle Atlas?
Pistacia lentiscus	1,600	High Atlas
Olea europaea	1,650	High Atlas
Callitris articulata	1,800	High Atlas
Arbutus Unedo	1,900	Anti Atlas
Pistacia atlantica	2,000	High Atlas
Quercus Suber	2,000	Rif
Quercus pyrenaica	2,000	Rif
Quercus faginea	2,200	Middle Atlas
Chamaerops humilis	2,200	High Atlas
Pinus halepensis	2,200	High Atlas
Pinus pinaster	2,200	Rif
Abies pinsapo	2,200	Rif
Cedrus atlantica	2,700	High Atlas
Quercus Ilex	2,800	High Atlas
Juniperus Oxycedrus	3,150	High Atlas

SOURCE: Personal observations and Louis Emberger, *Les Arbres du Maroc et comment les reconnaître* (Paris: Larose, 1938).

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[113] [30] M. Rikli, *Das Pflanzenkleid der Mittelmeerländer* (Bern: Hans Huber, 1943–1948), traces the natural range of most of the plants considered here. See also the "Notice explicative" accompanying Planche 19 *a*, "Forêts et ressources végétales," *Atlas du Maroc*, cited in note 7.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

RELICT SPECIES

137 The vegetation of northern Morocco has not only been modified by man, but has also undergone progressive natural change. In the varied Moroccan flora, European, Asiatic, and tropical elements are found along with species endemic to the Mediterranean region. During the Pleistocene, the southward movement of a colder and wetter climate brought corresponding southward migrations of European and Euro-Siberian plants. Europe and Barbary were no longer linked by land bridges, but seeds could easily blow or float across the narrow Strait of Gibraltar. Relicts of these invasions are found today in the mountains of northern Morocco in growths of fir (*Abies pinsapo, A. tazaotana*) and deciduous oaks (*Quercus pyrenaica, Q. faginea*) that seem strangely out of place in northern Africa.[11] Other Pleistocene relicts include birch (*Betula alba*), two species of maple (*Acer monspessulanum, A. Opalus*), alder (*Alnus glutinosa*), and the mountain ash, or service tree (*Sorbus torminalis*).[12]

ENIGMA OF THE OLEASTER

The olive tree (*Olea europaea*) has long been regarded as a symbol of the Mediterranean landscape. Since classical antiquity it has been recognized that not all olive trees are alike, that some grow without cultivation and produce small and bitter fruit. The "wild" olive, or oleaster, was long thought to be an endemic element of the Mediterranean flora and the ancestor of the cultivated tree. Victor [114] Hehn may have been the first to challenge this view on historical and philological grounds.[13] Today this problem is the subject of vigorous debate. Most authorities consider the oleaster to be a natural element of maqui, but some scholars, including August Chevalier, describe it as a "subspontaneous race," escaped from cultivation in ancient time.[14]

[245] In contrast to the common cultivated olive, the oleaster has four-angled thorny branches, broader leaves, and smaller fruit. Moreover, the oleaster, obviously, grows without cultivation or apparent care. None of these points proves that it is an ancestral wild race. As De Candolle remarks, "In a woody species which lives so long and shoots again from the same stock when cut off by accident, it is impossible to know the origin of the individuals observed."[15] To make matters worse, [245] it is a common practice in northern Morocco to graft scions of the cultivated olive to oleaster stock.[16]

The oleaster is best developed in the area covered by palmetto scrub, where the winters are too cold and wet for the cultivated race, but a few oleasters are seen

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[11] Changes of climate also have been invoked to explain the presence of wild olive (*Olea Laperrini*) and cypress (*Cupressus Dupreziana*) in the mountains of the central Sahara. L. Lavauden, "Les Forêts du Sahara," *Rev. des Eaux et Forêts*, 65 (1927), 265–277.

[12] The adaptation of "Nordic" species to the Mediterranean environment is considered by Andrea Giacobbe in "Les effets écologiques de l'aridité du climat sur la végétation méditerranéenne: héliophilie et configuration morphologique des forêts," *Unesco Arid Zone Research*, V, "Plant Ecology" (Proceedings of the Montpellier Symposium) (Paris, 1955), pp. 64–66.

[13] Victor Hehn, *The Wanderings of Plants and Animals from Their First Home* (London: Swan Sonnenschein, 1888), pp. 88–101.

[14] Aug. Chevalier, "L'origine de l'olivier cultivé et ses variations," *Revue de Botanique Appliquée et d'Agriculture Tropicale*, 28 (1948), 1–25.

[15] Alphonse de Candolle, *Origin of Cultivated Plants* (New York: Appleton, 1885), p. 280.

[16] Pliny (*Natural History*, XVII, 30) thought that this practice was limited to Africa.

in the semiarid region south of Melilla. Both varieties sprout vigorously, and 137
both are polymorphic. The latter fact is of major significance, for if the oleaster were a wild species it should be monomorphic, at least in a given area. Chevalier's argument is based upon this point. The seemingly primitive oleasters may be escaped and neglected variants of races that were once cultivated."[illegible] The longevity of the olive is lengendary; some sprouts in Algeria and Tunisia are almost certainly derived from Roman trees.[illegible] The fact that some trees have spines and small fruit may not be distinctive. Both varieties probably evolved from *Olea chrysophylla*, the true wild olive of southwestern Asia.[illegible] The oleaster may be no more difficult to explain than the "wild" pears and apples in the forests of France. It is not unusual for a neglected cultivated plant to become naturalized. Subspontaneous varieties of the cultivated carob tree (*Ceratonia siliqua*) are common in the Mediterranean region. In northern Morocco this tree, cultivated for its edible pods, is widely scattered in the area covered by palmetto scrub. Like the oleaster, it often appears to be a natural element of the maqui.

SHRUB FORMATIONS

In most of the Mediterranean basin, shrub formations now cover much more territory than do forests (fig. 8). In northern Morocco, shrub vegetation is dominated by dwarf palm or palmetto (*Chamaerops humilis*) and the xerophytic camel thorn (*Zizyphus lotus*). The range of these two species delimits two shrub formations, palmetto scrub and thorn scrub. The first formation is the *Oleo-Lentiscetum* (i.e., *Olea europaea—Pistacia lentiscus*) of most authors, but in northern Morocco neither of these plants is as conspicuous as the palmetto.

The palmetto (Arabic *doum*) is best developed on argillaceous soils in areas of mild temperature and moderate to heavy precipitation (fig. 7). These preferences explain the absence of palmetto in the cool highlands and its rare occurrence in semiarid areas. Dwarf palm may be seen on rocky knolls near Wad Moulouya, but most of the eastern half of northern Morocco is too dry for the species. In the western half of the zone the altitudinal limits of palmetto rise from west to east according to the lessening amount of precipitation.

The popular names "dwarf palm" and "palmetto" as well as the Linnaean binomial (*Chamaerops humilis*), derived from Greek and Latin roots meaning "dwarf or stunted bush," do not suggest that this plant may grow five to ten meters high. Excellent specimens of this height are preserved, however, at the cemeteries of Chella near Rabat and at Asni south of Marrakech. In northern Morocco I have seen tall palmettos on several sacred sites. Palmetto is exploited 000

[TEXT CONTINUED ON PAGE 25]

[illegible] H. Camps-Fabrer, *L'Olivier et l'huile dans l'Afrique romaine* (Algiers: Service des Antiquités, 1953), p. 11, states that charcoal from a midden near Tébessa in eastern Algeria "a révélé d'une manière certaine l'existence de l'oléastre en Afrique au Paléolithique Supérieur." But in the study to which she refers—R. le Du and L. Saccardy, "Étude de quelques charbons préhistoriques de la région de Tébessa," *Rev. Africaine*, 88 (1949), 111–119—there is no mention of oleaster. Charcoal of *Phillyrea*, another genus of the olive family, is mentioned, but this adds nothing to the history of *Olea europaea*. [113] [172]

[illegible] L. Joleaud, "L'ancienneté de la fabrication de l'huile en Afrique du Nord," *Rev. Africaine*, 70 (1929), 19–36. [113]

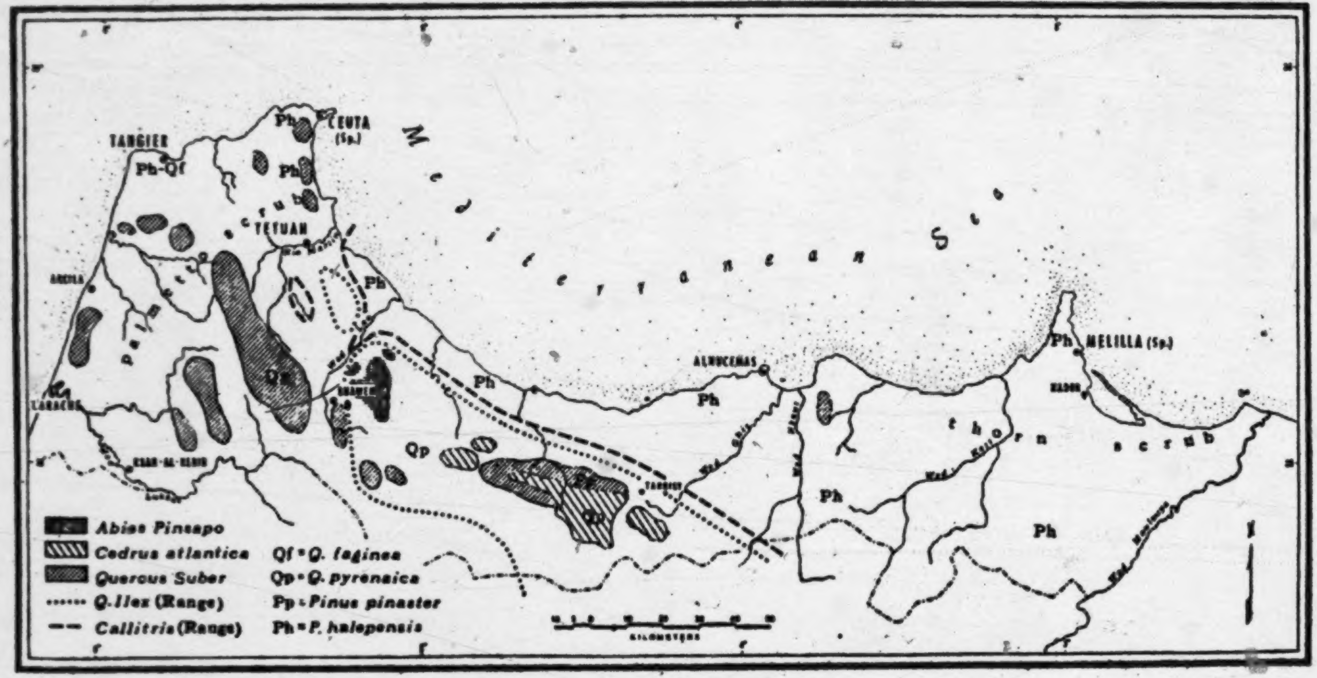
[illegible] If this be correct, the present range of the cultivated olive is almost completely separated from that of its ancestor. I. H. Burkill, "Habits of Man and the Origins of the Cultivated Plants of the Old World," *Proc. Linnean Soc. London*, 164 (1951–1952), 12–42, ref. to fig. 2, p. 16. [245]

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

R45
102
131
137

/p. 241



Mediterranean Sea
TANGIER
Ph-Qf
CEUTA (Sp.)
Ph
TETUAN
scrub
ARCILA
LARACHE
KSAR-AL-KEBIR
Qs
Qp
Pp
Ph
ALHUCEMAS
MELILLA (Sp.)
NADOR
thorn scrub
Abies Pinsapo
Cedrus atlantica
Quercus Suber
Q. Ilex (Range)
Callitris (Range)
Qf = Q. faginea
Qp = Q. pyrenaica
Pp = Pinus pinaster
Ph = P. halepensis
KILOMETERS

Fig. 8. Northern Morocco: distribution of forest and scrub.

Palmetto is exploited 262 443
for its edible bud, and the old women who sell *ghaz* (palm cabbage) are a common sight in the streets of Tetuán and Tangier. During the summer, when cereal stocks are low, many families spend some time digging up palmetto. [221]

Palmetto is exploited also for its fiber, used in the manufacture of *crin végétal.* 824 283 The collecting is done by women, who deposit bundles of palm blades near scales set out along most of the roads. The fiber is dried in the sun, and then twisted into loose rope and baled for marketing. The finished product serves as a substitute for horsehair in upholstering. In 1955, exporters in the northern zone handled 12,622 tons of fiber.[20] Native craftsmen make hats, mats, and baskets of the same material.

Disturbance of this sort encourages lateral development rather than tall growth 137 from a single stock, but seldom results in destruction of the plant.[21] The resiliency of palmetto is attested by its persistence in cultivated fields. The native farmer [241] has no means of eradicating the deep roots of this plant. Fields are burned and then cleared with hoes and cutting tools. This practice eliminates most shrubs, but it does not destroy palmetto. On the contrary, this plant, as a deep-rooting and heliophilous species, profits from the removal of competitive growth. When fields lie fallow or are abandoned, dwarf palm promptly begins to colonize.[22] In relatively undisturbed formations the palmetto is of secondary importance. It is not conspicuous, for example, in mature stands of cork oak. On sacred sites palmetto [778] is usually found on the edges of the protected growth. Where shrub vegetation is especially dense, as it is along the Mediterranean coast from Wad Lao to Puerto Capaz, dwarf palm grows on sunny south-facing slopes and on the upper edges of stream channels. Pure stands of palmetto seem to indicate floristic and morphologic impoverishment, a reduction of vegetation to its most resistant element.

Pistacia lentiscus (Arabic *dro*) is the second most important element of palmetto scrub. As with dwarf palm, it may be doubted that this plant should be described as a shrub. *Dro* usually appears as a shrub about one meter high, but where soils are deep and plants protected, it may grow three to five meters high. Such trees are rare today. With the exception of a few specimens scattered in the Anjra hills northeast of Tetuán, I have seen tall pistacias only on sacred sites and in a few areas protected by fences. In one form or the other this plant is encountered as an element of maqui in most of the Mediterranean region. It is found almost everywhere in Morocco; only in areas of extreme aridity and in the mountains above 1,500 meters is it absent. *Dro* is mixed with *Zizyphus lotus* in the Nkour

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[20] *Marruecos, zona jalifiana: guía económica* (Tetuán: Delegación de Economía, 1955), p. 59. 113

[21] The ability of the palmetto to survive disturbance is recognized by Theophrastus (*Enquiry into Plants*..., II, 6): "The dwarf-palm is a distinct kind, having nothing but its name in common with the other palms. For if its head is removed, it survives, and, if it is cut down, it shoots again from the roots." Louis Emberger concludes, in *Les Arbres du Maroc et comment les reconnaître* (Paris: Larose, 1938), p. 76: "Cette forme naine est determinée par l'action continuelle des troupeaux, qui broutent les jeunes pousses, et de l'homme qui exploite le Palmier nain pour en faire des cordages et consummer le cœur." M. Rikli, "Marokko," *Vegetationsbilder,* 24, Heft 4/5 (1934), concurs in this judgment, and adds that the prevalent form of the palmetto "als fuss- bis kniehohes Hartlaubgestrüpp ist sekundär, durch anthro- und zoogene Einwirkung entstanden." 137

[22] According to Louis Emberger, *Aperçu général sur la végétation du Maroc* (Bern: Hans Huber, 1939), p. 150, "son expansion est le résultat de la destruction des forêts dans lesquelles il était un élément floristique constant." G. Kuhnholtz-Lordat, *La Terre incendiée: essai d'agronomie comparée* (Nimes: Editions de la Maison Carrée, 1939), p. 44, coins a new verb, *endoumer,* the process by which forests degenerate to thickets of *doum.*

137 [314] delta, but it becomes progressively rarer toward the eastern semiarid sector of this zone. Pistacia wood is highly prized as a source of charcoal, and this fact alone may explain the plant's degraded appearance in the hills south of Tangier.

Pistacia rarely forms a pure stand. Several of the other plants found in palmetto scrub could be described as weeds, for they appear mainly in fallow fields. *Asphodelus microcarpus, Urginea maritima, Daphne Gnidium,* and one or more species of *Asparagus, Ononis,* and *Papaver* are prominent among them. In areas where most of the surface is cultivated, as in the Fahs territory south of Tangier, these plants, together with thistles and scattered clumps of palmetto, constitute all but a small part of the total inventory of vegetation. On rocky knolls and alluvial slopes too steep for cultivation, these plants grow among *Pistacia, Calycotome, Lavandula,* and the oleaster. The percentage of thorny plants is high. Besides *Calycotome* and thistles, *Carduus, Smilax,* and *Rosa* are found.

Dense shrub formations are rarely seen on the thickly settled Atlantic versant. One may walk unimpeded anywhere in the zone bounded by the Atlantic coast, Tangier, and Ksar al-Kebir. The thick shrub growth on the Mediterranean coast near Wad Lao contrasts sharply with the open formations on the Atlantic littoral. In the former area, *Cistus ladaniferus, C. albidus, Erica arborea, Pistacia lentiscus,* and *Arbutus Unedo* combine to form an impenetrable thicket. The limestone mountains of northern Morocco are almost bare of shrub or tree growth. [133] From Ceuta to Wad Lao the eastern horizon is dominated by a great wall of limestone, almost completely devoid of soil. The prevalent whiteness is disturbed only by scattered clumps of palmetto and spiny gorse (*Ulex parviflorus*).

In the area covered by palmetto scrub the persistent riparian plant is the toxic *Nerium oleander*. It may be accompanied by *Crataegus, Myrtus,* and *Arbutus,* but in most of northwestern Morocco the oleander is the only plant on the banks of streams. The presence of *Alnus, Populus, Salix,* and *Vitex* along stream channels in the Sanhajan highlands may be explained by the persistence in that area of other trees, especially cedar, juniper, and oak, which have been adequate thus far as a source of fuel and building material.

In the drier eastern sector of northern Morocco, palmetto scrub grades into a thorn scrub dominated by *Zizyphus lotus,* a spiny and xerophytic member of the buckthorn family (Rhamnaceae). It is difficult to draw a line between these two formations. Isolated clumps of palmetto are found as far east as the Moulouya Valley, and zizyphus extends up the valley of Wad Ghis as far as Targist.

Well adapted to aridity and continentality, *Zizyphus lotus* has become the dominant plant of Morocco's semiarid plains. Clumps of zizyphus are conspicuous within most of the area mapped as thorn scrub. This plant may grow three meters high, but is most often seen as a shrub. It is deciduous; and, during the dormant winter season, gray and seemingly lifeless clumps of zizyphus are a characteristic feature of the landscape. Its branches are widely used as fence material, and this practice enhances the contrast between the semiarid sector of northern Morocco and the wetter western zone, where *Opuntia* is planted as a hedge. The fleshy [262] drupe of zizyphus is collected wherever it grows; when cereal stocks are exhausted, "lotus bread" is an important food.[*]

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[222] [113] [*] *Zizyphus lotus* is occasionally planted in Andalusia, Portugal, and Sicily, but in northern Africa the fruit is collected from wild plants. Aug. Chevalier, "Les jujubiers ou zizyphus de

137 On protected sites, zizyphus and sumac (*Rhus pentaphylla*) form a thicket. In areas where zizyphus and sumac are mixed with *Pistacia atlantica,* the thorn scrub formation could be described as a thorn forest. Fields that have been fallow for several years are covered with *Asphodelus microcarpus, Marrubium alysson, Fagonia cretica,* and *Lycium intricatum* as well as the ubiquitous zizyphus. Alfa grass (*Stipa tenacissima*) covers part of the area between Ikibdhanen and Kar-Kar. Alluvial soils in the same general area are covered with esparto grass (*Lygeum spartum*) and dwarf sage (*Artemisia herba alba*). The areas occupied by these three species may be advanced colonies of the steppe formations of the upper Moulouya Valley and the Algerian Hauts-Plateaux.

FOREST FORMATIONS

As figure 8[A] indicates, most of the forest species in northern Morocco belong to the families Pinaceae and Fagaceae. Two evergreen oaks dominate the latter group: the holly or holm oak (*Quercus Ilex*) and the cork oak (*Quercus Suber*). The wide range of the holly oak is indicative of its edaphic and climatic tolerance (fig. 7).[B] In northern Morocco it is found from an elevation of about 500 meters up to the crest of the Rif chain. It is mixed with cedar and fir above 1,500 meters and with zizyphus in the semiarid region east of Alhucemas. *Quercus Ilex* may appear as a tall tree, but most specimens show the damaging effects of fire, cutting, and browsing. The holly oak is certainly a forest species, but it would be misleading to speak of forests of this tree. The area delimited in figure 8 merely indicates the zone in which specimens of this species are numerous. Many specimens are only two meters high. Emberger estimates that *Quercus Ilex* is spread over 700,000 hectares of Morocco, and that this territory may represent less than half of the primordial range.[illegible]

[132] The effective limit of the cork oak nearly coincides with the 400 mm. isohyet. *Quercus Suber* appears on schist in the highlands of Ghmara and Sanhaja, on sandstone in the mountains west of Tetuán and Shawen, and on Pliocene dunes south of Larache. Cork forests are not found on residual soils weathered from limestone, or on heavy alluvial soils. Most of the eastern half of northern Morocco is too dry for the cork oak. A single stand occurs in the highlands east of Wad [132] Nkour, where the orographic mechanism produces rainfall heavier than is observed in the neighboring lowlands.

The natural form of the cork oak is that of a large tree with a short trunk and spreading crown. Specimens of this form are rare today. Tall trees develop from seed regeneration, whereas most trees have a lateral growth that results from sprouting. The latter habit indicates a history of abuse, whether by cutting, burning, or browsing. Undisturbed forests usually have a shaded floor with little underbrush, but cork trees are more commonly accompanied by a number of shrubs. The faithful companion of *Quercus Suber* in northern Morocco is the woody briar *Erica arborea,* which also avoids calcareous soils. Under conditions of extreme degradation, the quick-seeding Cistaceae and the aggressive palmetto are more prominent than other undergrowth. Frequent disturbance, especially

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[222] [113] l'ancien monde et l'utilisation de leurs fruits," *Revue de Botanique Appliquée et d'Agriculture Tropicale,* 27 (1947), 470–482.

[illegible] Emberger, *Les Arbres du Maroc,* p. 117.

A, B, [See pp. 24 & 20 respectively--Analyst]

137 by burning, may completely destroy the oaks. The Mamora cork forest north of Rabat (137,000 hectares) is the largest in the world.[illegible] Cork oak covers about 100,000 hectares in the northern zone.[illegible]

314 Much of the economic activity in northern Morocco is concerned with the collection and shipment of cork. The bark of the trunk and the larger branches is utilized. Cork is first removed when trees are about twenty years old, with subsequent stripping every seven to ten years. The first yield (*liège mâle*) is very rough and coarse and of little value. Cork of subsequent stripping (*liège de réproduction*) is more homogeneous and of higher commercial value. In northern [464] Morocco, cork is collected by Spanish concerns with native labor, and also by small independent operators who collect cork from isolated villages and carry [439] it to places of deposit on the main roads. Most of the cork from northern Morocco is shipped in bulk to Spain.

137 Deciduous oaks cover about 7,000 hectares in northern Morocco. Two species are represented, and they have the scattered distribution characteristic of relicts. The larger stand of deciduous oaks grows at an elevation of about 1,000 meters in the mountains west of Shawen and southwest of Bab Taza—Jbil Buhashim, Jbil Sugna, and Jbil Hazana. *Quercus pyrenaica = Q. Tozae* is the species in this area; it appears also at elevations of 1,200–2,000 meters on Jbil Tiziran and, as the binomial indicates, in the Pyrenees. The second species, *Q. faginea = Q. lusitanica*, is scattered over the Sanhajan highlands. The largest stands are on the slopes between Jbil Tiziran and Jbil Leshab. Other stands appear on the slopes of Adrar Tidighin and Adrar Taghzut, and there are a few trees mixed with *Erica arborea, Cistus ladaniferus,* and *Pistacia lentiscus* in the maqui near Tangier.

It is difficult to explain the scattered distribution of the deciduous oaks. They are abundant in the largest forested area (fig. 8), that of the mountains west of Shawen, but many of the trees in this forest were cut by the Spanish for use as railroad ties. Both species seem to be calcifuge, and it is unlikely that either will be found in the drier parts of the zone. The scattered and mountainous distribution suggests that the deciduous oaks are Pleistocene relicts now restricted to the coolest and wettest parts of northern Morocco. The extreme polymorphism of *Quercus faginea*, with its great number of subspecies and races, seems to support this view.

The highest peaks in northern Morocco are clothed with forests of fir and cedar. The former genus is confined to the calcareous mountains east of Shawen. Two species are present: *Abies tazaotana* occurs at elevations of 1,500–1,854 meters on Jbil Tazaot, and *A. pinsapo* appears on Jbil Maggo, Jbil Tisuka, and Jbil Leshab, as well as in the mountains near Ronda in southern Spain. This restricted highland distribution again suggests that these species are relicts. On Jbil Tisuka and Jbil Leshab, forests of fir begin at an elevation of 1,600

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[113] [illegible] Estimate of Emberger, *Aperçu général sur la végétation du Maroc*, p. 101. For an excellent description of the Mamora forest see A. Métro and Ch. Sauvage, *Flore des végétaux ligneux de la Mamora* (Rabat: Société des Sciences Naturelles et Physiques du Maroc, 1955).

[113] [illegible] This figure and the estimates of forested surface in later paragraphs are taken from S. Sánchez Cózar, "Montes," *Conferencias desarrolladas en la Academia de Interventores durante el curso de 1947* (Tetuán: Imprenta del Majzen, 1948), pp. 5–25. Earlier estimates appear in E. Gonzáles Vázquez, *El Marruecos forestal* (Madrid: Ediciones Técnicas, 1945).

137 meters and persist up to the summits at slightly above 2,000 meters. Fir forests are never pure. Deciduous oaks replace fir in moist canyons, and the maritime pine is found on drier, south-facing slopes. Cedar is scattered through most stands of fir, but is conspicuous only on the highest peaks. There are about 6,000 hectares of fir forest in northern Morocco.

The Atlas cedar (*Cedrus atlantica*) is North Africa's most valuable source of timber.[n] Cedar forests are found in the Rif and the Middle and High Atlas in Morocco, and on some of the highest peaks in Algeria. In northern Morocco cedar forests extend from the calcareous range east of Shawen to the schistose mountains south of Targist. A single isolated stand appears on Jbil Kelti, in the karstic mountains of Bani Hassan. The best forests are found on siliceous soils in the Sanhajan mountains, where the cedar is prominent from an altitude of 1,600 meters to the summits of the highest peaks (pl. 1, *b;* pl. 10, *a*). In the valley of Wad Ouergha some cedars may be seen as low as 1,000 meters, and a small stand of very large trees appears at Tlata Ktama at 1,300 meters. In the High Atlas, cedar forests give way to *Juniperus thurifera* at about 3,700 meters. There is no natural timberline in northern Morocco, but trees are stunted on the highest peaks (pl. 1, *b*). Distortion caused by strong winds is especially evident on the summit of Adrar Tidighin. Stumps a meter in diameter have about a hundred rings, but it is difficult to generalize about the age and size of trees, for edaphic and microclimatic factors are highly varied in mountainous terrain.

In the few areas where cedar forests are undisturbed, closely spaced trees shade out shrubs, and undergrowth consists mainly of ferns (*Pteris apulina*). On steep slopes and on the edge of clearings, cedars are mixed with *Juniperus Oxycedrus* and cork oak or holly oak. When cedar forests are cut or burned, the oaks become dominant. When the latter also are destroyed, forest degenerates to scrub. Badly degraded slopes are covered with scrub oaks (i.e., sprouts from the damaged trunks of holly oak or cork oak), *Genista quadriflora, Cistus laurifolius, Halimium lasiocalycinum, Cytisus megalanthus, Daphne Gnidium,* and *Thymus riatarum.* Where destruction of the forest is accompanied by severe erosion, slopes may be covered only by widely spaced clusters of *Genista* and occasional junipers. In areas of sparse human population, stream channels are lined with *Alnus glutinosa, Salix purpurea, Populus nigra, Crataegus laciniata, Rosa canina, Betula alba,* and *Vitex Agnus-castus.*

The distribution of the Moroccan pines is difficult to explain. Two species are identified in figure 8. The maritime pine (*Pinus pinaster*) is scattered in the Rif highlands from Shawen to the Nkour Valley, and the Aleppo pine (*P. halepensis*) appears in the foothills of the Rif chain and at several places on the Mediterranean coast. There are a few stands of maritime pine in the Sanhajan highlands, all on the Mediterranean versant and all at an elevation of about 1,500 meters. Near Izagan the maritime pine appears to have colonized areas previously occupied by the cedar.

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[n] Taxonomists usually distinguish four species of *Cedrus:* the Atlas cedar (*C. atlantica*), the Cyprus cedar (*C. brevifolia*), the cedar of Lebanon and southwestern Turkey (*C. Libani*), and the Himalayan deodar (*C. deodara*). Actually, the distinction among these forms is trivial, and some authors prefer to regard them as geographical variants of a single species. René Marie, in his monumental *Flore de l'Afrique du Nord* (Paris: Lechevalier, 1952), lists the Atlas cedar as *Cedrus libanotica* ssp. *atlantica.* The best general description of the ecology of the several "species" is Louis Emberger's "Contribution à la connaissance des Cèdres," *Revue de Botanique Appliquée et d'Agriculture Tropicale,* 18 (1938), 77–92. (113)

On the lower slopes of Jbil Leshab a dense cluster of Aleppo pine has been preserved on the site of a cemetery. In this area it is probable that *Pinus halepensis* once occupied an intermediate position, above forests of cork oak but below the zone occupied by cedar and fir. Another small stand of Aleppo pine, consisting of a few hundred trees, is visible from the Tetuán-Shawen route, a few kilometers north of Arba Bani Hassan. A few pines appear on the dunes between Rincón and Ceuta, and there is a small population on the Ceuta promontory. Aleppo pines appear also at Cape Malabata, opposite Tangier, and a few are scattered in the foothills between Wad Lao and Puerto Capaz. In the drier sector of northern Morocco the Aleppo pine is found on the Melilla peninsula and in the hills between the Moulouya Valley and Wad Nkour.

This distribution would be a severe challenge to the most imaginative plant geographer. In the areas in which the Aleppo pine grows, precipitation varies from 1,000 mm. to less than 400 mm. The Aleppo pine appears on Recent dunes south of Ceuta, and on consolidated Pliocene dunes north of Melilla. It grows on sandstone in the Tangier area, and on gneiss at the Ceuta promontory. The scattered pines between Wad Lao and Puerto Capaz grow on a variety of soils, weathered from schist and metasediments. Other trees appear on calcareous soils, and an excellent plantation has been established near Nador on andesite and basalt. It may be necessary to describe the Aleppo pine as a relict now in process of expanding. This explanation is tenable. Relict populations may become centers of dispersal if competitive vegetation is destroyed.[illegible] Fire, browsing, and other processes that discourage oaks and cedar favor the Aleppo pine, which is remarkably xerophytic and will thrive on thin mineral soils.[illegible]

The Barbary thuya, or sandarac tree (*Callitris articulata = Tetraclinis articulata*), is even more xerophytic than the Aleppo pine, but is less tolerant of cold. Apart from a few specimens on Malta, and in Cyrenaica and southern Spain, the thuya is restricted to northwestern Africa.[illegible] Thuya formations appear in the highlands of Tunisia and over a large part of Oran province in Algeria; but Morocco is the principal domain of this tree. On protected sites, thuyas may grow to a height of ten meters, but in most of the area outlined in figure 8 they are shrubs. In the northern zone their range can be delimited by the 1,000-meter contour and the 400 mm. isohyet. This concentration indicates a preference for mild temperatures and semiaridity. The presence of thuyas in more humid areas is explained by calcareous soils and rain shadows.

It would be hard to find a species better adapted to survive disturbance. The thuya is one of the few resinous trees that will sprout vigorously if damaged

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[illegible] In reference to the cedar forests of the High Atlas, Emberger, in *Aperçu général sur la végétation du Maroc*, p. 95, remarks that "la dégradation de la végétation dominante actuelle favorise l'extension du Pin d'Alep dans les régions où l'état antérieur de la végétation ne lui permettait pas de prendre pied."

[illegible] Kuhnholtz-Lordat, *op. cit.*, p. 121, cited in note 22: "Autour de la région méditerranéenne, on assiste depuis longtemps au mécanisme de la régression de la sylve originelle. C'est le Pin d'Alep qui y joue le rôle le plus important dans les paysages de substitution en raison de son aptitude à coloniser les terres dénudées, cultures abandonées, terrains incendiés."

[illegible] Not to be confused with the genus *Thuja* (arborvitae), another member of the cypress family.

137 by cutting, browsing, or fire. This ability explains the presence of scrub thuya
in deforested areas. But it grows slowly and is sensitive to disturbance in its
early years. In the area delimited on the map, thuyas are widely scattered
and for the most part badly mutilated. Large formations have been completely
[313] destroyed. More than half of the houses in the eastern part of the Rif have
[314] rafters of thuya, which is used, wherever it grows, as a source of charcoal. The
Barbary thuya has been used for centuries in making cabinets and other furni-
[322] ture, and was esteemed by the Romans for roofing temples.[11] Damaged trunks
sometimes develop giant burls, which have been used since classical time as table
[314] tops. A hard resin, sandarac, exudes from the trunks, and a modest quantity
[439] of it is shipped to Britain, where it is used in the manufacture of varnish.[12]

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[11] Pliny, *Natural History*, XVI. 231, XXXIII, 146.

[113] [12] W. Dallimore and A. Bruce Jackson, *A Handbook of Coniferae* (London: Edward Arnold, 1948), p. 610.

CHAPTER III

CULTURE HISTORY PRIOR TO EUROPEAN INTERVENTION

172 174 FOR THE POPULATIONS and civilizations that reached it, Morocco was a cul-de-sac. Every movement came up against the Atlantic barrier and was retarded by the hostile environment of the Sahara. During the Pleistocene epoch and, indeed, during the first millennia of Recent geologic time, Morocco was a redoubt in which outmoded ways of life perfected themselves in isolation. The descendants of the Neolithic farmers remained dependent on stone tools three thousand years after the Egyptians, at the other end of the Mediterranean, had begun to use metal. Basically, the Stone Age cultures still persist, in spite of Phoenician, Roman, Arab, and European influence.

000 The historic accounts of the Canary Islands are of special interest. When the Norman and Spanish conquerors reached the Canaries a few generations before the discovery of America, the islanders spoke a Berber dialect and still retained their Neolithic culture. They used stone tools, and fashioned implements from wood, horn, and shell. They produced crude and underfired pottery in the Neolithic style, and their textiles were plaited matting and basketry. Their clothing was of cured goatskin, and their houses were made of stone, pine timbers, and earth. They raised pigs, dogs, sheep, and goats, and grew barley and wheat. They knew how to preserve meat by drying and milk by making cheese. Add metal, weaving, and the crops and animals introduced from southwestern Asia and the Americas, and this outline of material culture is little different from that of an isolated Moroccan village of today.[1]

THE PROBLEM OF CLIMATIC CHANGE

172 132 A mass of circumstantial evidence suggests that Barbary has become drier since the time of the Roman occupation. The impressive ruins of Thamugadi (Timgad) and the great amphitheater of Thysdrus (el-Jem) now stand on desolate plains. The ancient seaports of Leptis Magna and Sabratha were found buried under an immense drift of sand. Mosaics and historical records tell of the presence in Roman Africa of elephants, lions, and other wild animals now confined to the tropical zone. Further examples of change presumed to be a result of desiccation could be cited, but these suffice to illustrate the type of evidence that impresses the traveler.

It cannot be denied that the landscape of northern Africa has changed since
174 classical time, but the thesis of a climatic explanation of this change is difficult
132 to defend. Most of the evident deterioration can be traced to neglect or destruc-
114 tion by man. Aqueducts, dams, and cisterns made possible the building of the
182 now dead cities. With the collapse of the Pax Romana, marginal land dependent on irrigation went out of cultivation. Burning, cutting, and overgrazing

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[113] [1] Leonardo Torriani, *Die kanarischen Inseln und ihre Urbewohner;* trans. from the MS of 1590 by D. J. Wölfel (Leipzig: K. F. Koehler, 1940), Vol. VI of *Quellen und Forschungen zur Geschichte der Geographie und Völkerkunde.* C. S. Coon, in *Caravan: The Story of the Middle East* (New York: Henry Holt, 1951), pp. 36–40, calls attention to the Canary Islanders as "Berbers" unaffected by foreign influence.

174 132 114 182 favored the propagation of xerophytic and heliophilous plants, and thus enhanced the illusion of desiccation. The "tropical" animals pictured on Roman mosaics did not die out as a result of climatic change; they were exterminated by man. The last elephants probably disappeared in Roman time. Lions may have been in the Atlas Mountains until about 1900. Ostriches, antelopes, and other animals nearly extinct in the Sahara still survive along the upper reaches of the Saqiyah al-Hamra in Río de Oro. The arguments for and against desiccation in historic time have been debated at length, and the weight of evidence is against a significant change in climate.

THE BERBERS

101 The autochthonous inhabitants of northern Africa are usually described as Berbers. In classical times this appellation, derived from Greek and Latin roots meaning "barbarian," was applied to individuals or groups living beyond the Orbis Romanus. Today Berber is applied as a general name, devoid of pejorative implication, to North Africans who are not Arabized. The people thus designated refer to themselves as *imazighen* (nobles). The European term serves a useful function if its application is determined by the persistence of Berber speech, but confusion results when it is given racial, moral, or psychological connotation. Romantic notions of the Berbers as "noble savages" may be found even in serious works. The French had an instinctive liking for the Berbers, because they seemed more European than Oriental in physical appearance and mental outlook. But the policy of encouraging Berber languages, Berber law, and Berber traditions, as a means of checking Arab nationalism, had at best only temporary success.

142 141 The racial characteristics of the Berber-speaking peoples are far from uniform. In the Kabylie, Aurès, Rif, and Atlas mountains one may see dolichocephalic people, with blue or gray eyes, and light brown or even blond hair. Other Berber-speaking peoples are darker and have round heads. Many Berbers are of the classical Mediterranean type. The Tuareg form another group, tall and lean, with short bodies and long limbs. The physical characteristics of the indigenous peoples [144] of northern Africa seem to have resulted from the crossing of several races during widely separated periods.

101 114 [648] The confusion surrounding the meaning of "Berber" is further complicated by the fact that French colonial policy called for a division of Morocco into Berber and Arab territories, each with a distinct system of local government and law. In unreasoned protest against the implications of this policy, some authors, sympa-

[TEXT CONTINUED ON PAGE 35]

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(113) There are many discussions of this problem: Stéphane Gsell, *Histoire ancienne de l'Afrique du Nord* (Paris: Hachette, 1913–1928), I, 44–99; Jean Despois, *La Tunisie orientale: Sahel et Basse Steppe* (Paris: Les Belles Lettres, 1940), pp. 237 ff.; Rhoads Murphey, "The Decline of North Africa since the Roman Occupation: Climatic or Human?" Association of American Geographers, *Annals*, 41 (1951), 116–132; and K. W. Butzer, *Studien zum vor- und frühgeschichtlichen Landschaftswandel der Sahara* (Wiesbaden: Franz Steiner, 1958), pp. 5–17.

(113) For an interesting example of Berber romanticism, see Edouard Brémond, *Berbères et arabes: la Berbérie est un pays européen* (Paris: Payot, 1950).

(113) C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931); L. Cabot Briggs, "The Living Races of the Sahara Desert," Peabody Museum of Archaeology and Ethnology, *Papers*, 28 (1958).

(113) As recently as September, 1956, pamphlets urging the Berber tribes to revolt against "Arab imperialism" were distributed in Morocco. The Moroccan police promptly established that these tracts had been typed and mimeographed on machines used by an organization known as the "Présence Française." For the text of one of the tracts and the Moroccan reaction to it, see *Al-Istiqlal*, September 7, 1956, and the *Tangier Gazette*, September 14, 1956.

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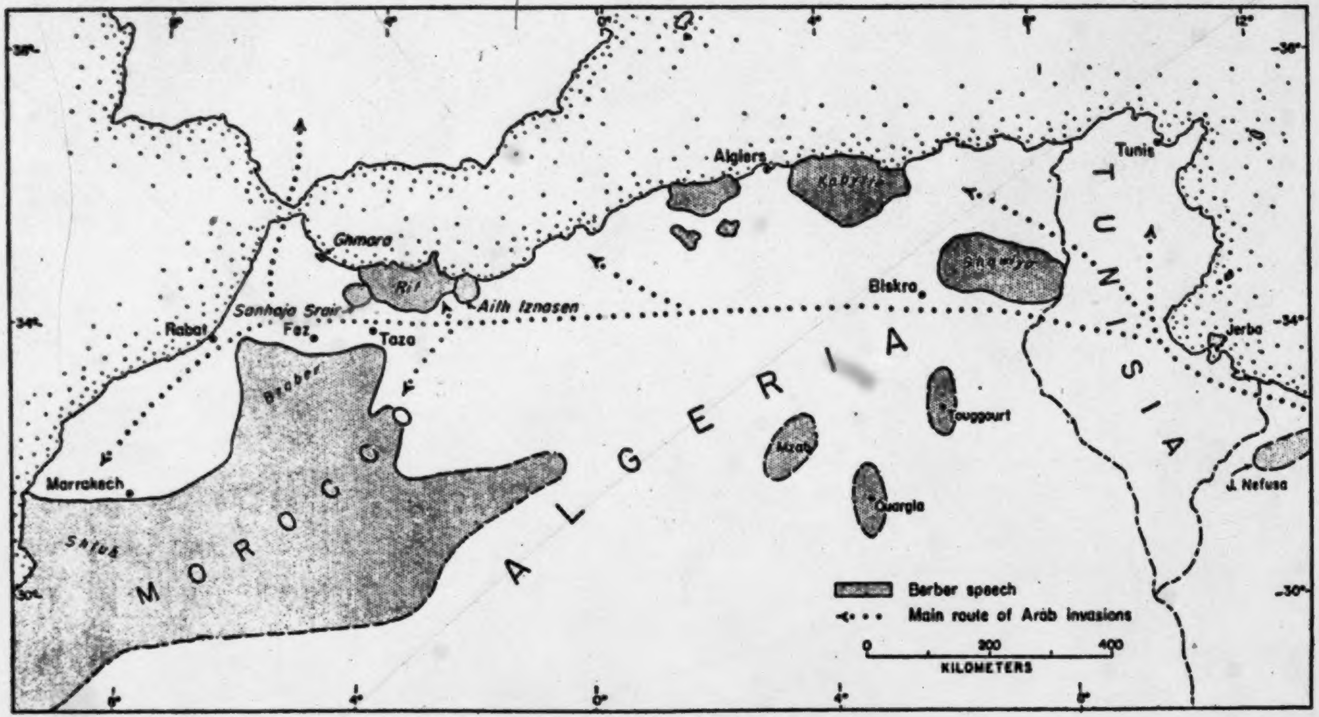
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Shluh
MOROCCO
ALGERIA
TUNISIA
Algiers
Kabylia
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KILOMETERS

Fig. 9. North Africa: distribution of Berber speech.

101 114 thetic to Moroccan or "Arab" nationalism, refer to a "Berber myth" and refuse to recognize any ethnic division in the country.[6] The *politique berbère* may have had its faults, but this fact does not mean that we should rewrite Moroccan history.

197 Berber dialects are still spoken by six to seven million people, including about 45 per cent of the population in Morocco, about 30 per cent in Algeria, and about 2 per cent in Tunisia.[7] Berber dialects are spoken also in the Jabal Nefusa and the Siwa oasis in Libya,[8] and on the southern fringe of the Sahara. The Berber language once extended to the Canary Islands.

The Berber-speaking peoples of northern Africa are now concentrated in five groups: Rifians, Braber, Shluh, Kabylies, and Shawiya (fig. 9). They are chiefly mountaineers, and all but the Braber, who practice transhumance, are sedentary [177] farmers. The other groups include the Ghmara, who are almost completely Arabized, the tribesmen of Sanhaja as-Srair, a small colony on the island of Jerba, the Tuareg of the central and southern Sahara, and the inhabitants of the oases of Mzab, Touggourt, Ouargla, Ghardaia, Figuig, Gourara, and Touat.[9]

The original home of the Berber language is unknown, but scholars believe that it is most nearly related to Ancient Egyptian, Cushite, and certain of the Chad languages, which are traditionally but perhaps improperly called Hamitic.[10] This relationship reinforces the theory advanced by archaeologists that the Neolithic of northern Africa shows Egyptian influence.[11] In spite of a bewildering number of dialects, which is normal for an ancient language without literature, Berber can be divided into three groups: Masmuda, Sanhaja, and Zenata.[12] Masmuda was the language of the majority of the sedentary farmers before the Arab invasion. The Shluh and the Ghmara speak it today; Rifian is thought to be a mixed form. The Sanhajan dialect was the speech of the transhumants and nomads. It is now spoken in northern Morocco (Sanhaja as-Srair), in the Middle Atlas, and by the Kabylies, Shawiya, and Tuareg. Zenatiya, formerly confined to the high plateaus of Algeria and the Oujda region, has spread to many of the Saharan oases, including distant Siwa. Because of natural population growth the number of Berber speakers has increased, but the area of Berber speech has lost ground to Arabic. In fact, since the Muslim conquest Berber has gained ground only in Negro Africa, where some tribes in the Niger Territory and the French Sudan have adopted the Tuareg dialect. Without fixed grammar or an effective system [212] of writing, Berber could not compete with the language of the Prophet.[13]

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[113] [6] Marvine Howe, "The Birth of the Moroccan Nation," *Middle East Jour.*, 10 (1956), 1–16.

[7] G. H. Bousquet, *Les Berbères* (Paris: Presses Universitaires de France [collection "Que Sais-Je?"], 1957), pp. 16 ff.

[113] [8] Louis Dupree, "The Non-Arab Ethnic Groups of Libya," *Middle East Jour.*, 12 (1958), 33–44.

[113] [9] On the distribution of Berber speech, see also André Basset, *La langue berbère* (London: Oxford University Press, 1952).

[113] [10] J. H. Greenberg, *Studies in African Linguistic Classification* (New Haven: Compass Publishing Co., 1955). First published in *Southwestern Jour. Anthro.*, 5, 6, 10 (1949–1954).

[113] [11] Egyptian influence on north African rock art is examined in Raymond Vaufrey, "L'art rupestre nord-africain," *Archives de l'Institut de Paléontologie Humaine*, Mémoire 20 (1939). The most striking evidence of direct influence is the presence in Algeria of rock drawings of rams wearing the solar disk associated with the worship of Re. When worn by the ram, which was sacred to Amon of Thebes, it indicates Amon-Re, the composite god of Egypt during the New Kingdom (1600–1100 B.C.).

[12] These are the major genealogical divisions of Ibn Khaldun. Strictly speaking, it is not correct to use this division in linguistic classification.

[13] The only system of writing at the time of the Arab conquest was the Libyco-Berber alphabet used in rock art. This alphabet was probably developed from ideas borrowed from the Phoeni-

531 In addition to a common language, certain other culture traits are shared by
171 most Berbers. The Berber arts still differ from the Islamic arts acclimatized in
Barbary. Designs on pottery, rugs, and blankets are almost entirely in geometrical
patterns. Nothing could be clearer than the contrast between the lozenges and
chevrons of Berber work and the complicated floral and epigraphic designs of
342 Levantine art. The simple houses of the Moroccan highlands probably are local
171 variants of the prevalent Mediterranean types, but the multistoried buildings of
rammed-mud blocks in southern Morocco show eastern affinity. Indeed, no traveler
who has seen the Moroccan *qsar* and the "skyscrapers" of southern Arabia can
171 fail to be impressed by the similarity of the two.[14] Similarity of this sort suggests
diffusion of style and techniques from a common center, possibly eastern Africa,
which may also have been the main center of the "Hamitic" languages.

771 A few nonmaterial traits also can be associated with Berber speakers. We can
789 still discern among them the remains of an agrarian animism. The ceremonies that
171 seek to obtain through rain, considered as the male element, the fecundity of the
[772] soil, which represents the female, are doubtless of this category. Wherever Berber
is spoken, the important events are reckoned by solar months, not by the Muslim
[805] lunar calendar.[15]

Until recently the social organization of most Berber-speaking communities
631 differed from the Arab or Muslim order.[16] The Berber districts were characterized
by extreme fragmentation into small units, each guided by ideals of independence
[596] and self-sufficiency.[17] The cell of each unit was the family. Several families formed
[614] clans, with about a hundred members who traced their descent from a common
ancestor. In the regions of deep-rooted peasantry, particularly in the mountains,
631 groups of related people were linked by means of assemblies composed of delegates
634 from each family.[18] The function of the assembly was to regulate the tasks and
taxes of the community. To ensure the execution of decisions and to facilitate
relations with other assemblies, a chief, or elder (*amghar*), was appointed, but
he was only the delegate of the assembly and every precaution was taken to prevent
aggrandizement of his powers. A prudent rotation arranged for the representatives of the principal families to take office in turn. The territory governed by the

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[212] cians. In modified form, it is still used by the Tuareg. G. Marcy, "L'épigraphie berbère numidique et saharienne," *Annales de l'Institut d'Études Orientales*, 2 (1936), 128–164; F. R. Wulsin, "The
[113] Prehistoric Archaeology of North-West Africa," Peabody museum of Archaeology and Ethnology, *Papers*, 19 (1941), 111–114.

[113] [14] Cf. the photograph of San'a in Harry Hoogstraal, "Yemen Opens the Door to Progress," *Nat. Geog. Mag.*, 101 (1952), 238, and of Tinerhir in Jean and Franc Shor, "From Sea to Sahara in French Morocco," *ibid.*, 107 (1955), 178–179.

[113] [15] Other examples of pagan survivals in Morocco are given in three works of Edward Westermarck: *Ceremonies and Beliefs Connected with Agriculture, Certain Dates of the Solar Year, and the Weather in Morocco* (Helsinki: Akademiska Bokhandeln, 1913); *Ritual and Belief in Morocco* (London: Macmillan and Co., Ltd., 1926); and *Pagan Survivals in Mohammedan Civilisation* (London: Macmillan and Co., Ltd., 1933).

[113] [16] The remarks to follow are based upon Robert Montagne's *Les Berbères et le makhzen dans le sud du Maroc: essai sur la transformation politique des berbères sédentaires (groupe Chleuh)* (Paris: Alcan, 1930).

[17] I use the past tense because the French-sponsored *dahir* of May 16, 1930, which called for a division of Morocco into two districts, one under Qur'anic and the other under tribal law, was repealed on September 4, 1956. Under the present system the functions of the assemblies are exercised by officials appointed in Rabat.

[113] [18] With excellent insight, Konrad Wiche, "Marokkanische Stadttypen," in *Festschrift zur Hundertjahrfeier der geographischen Gesellschaft in Wien, 1856–1956* (Vienna, 1957), p. 492, describes the Berber assemblies as *Talschaften* (valley associations).

631
634 assembly was an economic unit. In the Shluh area of southwestern Morocco most
343 of the independent communities have still or had formerly a collective storehouse,
171 or *agadir* (Berber *tighremt*), administered according to minutely established
rules.[19]

Under normal conditions the social hierarchy did not extend beyond the family
and the assembly. Larger groups assumed importance only in periods of crisis,
as when there was a revolt against the sultan or need of defense against an enemy.
619 The next order, which is still of minor importance, is the tribe, traditionally formed
[634] of the members of three to ten assemblies. The members of a tribe also claim descent
[614] from a common ancestor. The genealogical connotation is apparent in tribal names,
which are usually prefixed by *bani* or *aith*, Arabic and Berber, respectively, for
"sons of" and "people of." Each tribe has at least one weekly market and a sanctuary—the tomb of the patron of the tribe—which is the focus of an annual pilgrimage. But the manifestations of tribal unity were and are largely ceremonial, and
in the past tribal chiefs were elected only in time of war. Moreover, the tribal unit
619 was divided and weakened by an elaborate system of moieties (*leff*). All the com-
616 munities making up a tribe were thus paired, and every family or clan had the
right to call upon its *leff* brothers in an emergency. At various times in Moroccan
631 history, tribes have been grouped to form confederations, but large organizations
619 of this sort had neither a permanent chief nor an assembly. With the exception
of the Rifians, most Moroccans have lost interest in the confederations. "On the whole," as Henri Terrasse remarks, "Morocco has been a conglomeration of little Berber republics keen to maintain their autonomy and, in case of need, to defend vigorously or reconquer in pitiless revolts their independence and their customs."[20]

177 Wherever Arabic has replaced Berber speech, there also Qur'anic law has
replaced the old tribal order. In such areas one can no longer speak of "Berbers," but neither can one speak of "Arabs," in the sense of Arabians or Levantines. The cultural dichotomy now evident in northern Africa is the result of a long process of assimilation. The forces which have brought about Arabization are analogous to those which produced the Hispanization of Latin America. This analogy is reasonable, for the number of Arabians in the Atlas is probably no larger than the number of Spaniards in the Andes.

PUNIC AND ROMAN INFLUENCE

175 The historic period did not begin at the same time for the whole of Barbary.
Along the coast it began with the arrival of the Phoenicians, late in the second or early in the first millennium B.C. It is probable that the Barbary coast was visited by Minoans and Egyptians also, but there is no evidence that they founded colonies. The regions occupied by the Phoenicians became part of the civilized Mediterranean world. Carthage, near the modern city of Tunis, was founded in 814 B.C. by settlers from Tyre. Utica, thirty kilometers to the northwest, and Gades (Cádiz) date from 1101 B.C. Other settlements, a day's voyage apart, were founded on the Algerian coast. On the Rifian coast it appears that colonies were

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[113] [19] For detailed accounts of the Moroccan granaries, see Dj. Jacques-Meunié, *Greniers-citadelles au Maroc* (Paris: Larose, 1951); and Robert Montagne, *Un Magasin collectif de l'Anti-Atlas: l'Agadir des Ikounka* (Paris: Larose, 1930).

[20] Henri Terrasse, *Histoire du Maroc* (Casablanca: Editions Atlantides, 1949), I, 33.

175 established at Rusaddir (Melilla), Tingi (Tangier), and one or more intermediate points, but the regular chain of trading stations did not extend west of Cartennae (Ténès). The strong strategic position of Carthage and the comparable one of Gades enabled the Carthaginians, who were uncompromisingly intolerant of interlopers, to prevent any interference with their trade by foreigners. There was no need to occupy a continuous stretch of the north African coast.

Active interest in the Atlantic coast of Morocco seems to have been delayed until after Tartessos had been destroyed and the Carthaginians had gained control of the Spanish silver mines. Even then the commercial importance of Carthage continued to be based upon its privileged situation at the contact of the two Mediterranean basins. The evidence, both historical and archaeological, suggests that Punic merchants did not develop a serious interest in the open sea until after the commercial possibilities of Sicily, Sardinia, the Balearic Islands, and western Iberia had been thoroughly explored. In classical time, Mare Altum was thought to be a domain of "demons, eerie darkness, mudflats, and immense fields of seaweed" from which no ship could free itself. But, as Paul Hermann suggests, these tales may have been deliberately spread by the various powers in control of the Strait to discourage competition.

The periplus of the Carthaginian admiral Hanno, who between 475 and 450 B.C. led an expedition of discovery and colonization to the Atlantic coast of Africa, still gives rise to long arguments. It is not necessary to review the arguments for and against the notion that he sailed as far as the Gulf of Guinea. The important point is that this expedition was commissioned to found colonies on the Moroccan coast. Six colonies are named in the periplus, but no two scholars agree on their location. Punic remains have been unearthed only at Tingi (Tangier), at Lixus (near Larache), and on a rocky islet off Mogador, but other settlements are mentioned in inscriptions or on coins.

Carthage itself rapidly became a great metropolis, but the Carthaginian land empire was never large. In the third century B.C. it seems to have included nearly all northern Tunisia but very little of Algeria, apart from a narrow zone along the coast. Much of eastern Algeria became Punic in language and culture, but the more remote trading stations were separated by large areas under barbarian control. "The power of Carthage," as Miss Semple suggests, "was based on its overseas trade and the land beneath its feet, not on the big continent at its back."

The Carthaginians were so successful in concealing their secrets that we can draw only tentative inferences about the nature of their trade. It is likely that

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175 Ch.-André Julien, *Histoire de l'Afrique du Nord* (2d ed., Paris: Payot, 1956), I, 65, and fig. 4.

175 On the chronology of Phoenician expansion, see Rhys Carpenter, "Phoenicians in the West," *Am. Jour. Archaeol.*, 62 (1958), 35–53.

113 Paul Hermann, *Conquest by Man* (New York: Harper and Bros., 1954), p. 36. The Carthaginians sought to prevent other powers from gaining access to the tin of Cornwall and Brittany. The exclusion of the Greeks and Romans from the coastal waters of the western Mediterranean is reflected also in the paucity of information given by the classical authors about the African trade.

For an English translation of the periplus, see B. H. Warmington, *Carthage* (London: Robert Hale, 1960), pp. 62–64.

For discussion of the probable range of Punic settlement in Morocco see Pierre Cintas, *Contribution à l'étude de l'expansion carthaginoise au Maroc* (Paris: Arts et Métiers Graphiques, 1954).

E. C. Semple, *The Geography of the Mediterranean Region: Its Relation to Ancient History* (New York: Henry Holt, 1931), p. 141.

most of the Punic trade was of an entrepot nature, with goods carried from one country to another or raw materials exchanged for finished products. The Carthaginians were not dependent on Africa itself for the support of their trade. Indeed, the Berber tribes of the littoral were probably too primitive to be able to make any great contribution to it. Wool, skins, timber, purple dye, ivory, and ostrich feathers were the principal local products that found their way into foreign ports. It is not known whether the Carthaginians imported gold or slaves from across the Sahara, but it is reasonable to suppose that Hanno's expedition was intended to establish an easier route for such a trade.[illegible]

It follows that cultural changes during this period should be described largely in terms of diffusion or drift, not as a direct exchange. The Carthaginian merchants carried not only the objects of their trade but also customs and techniques, ideas and beliefs. Elements of Punic culture, both material and nonmaterial, seem to have spread far beyond the coastal towns. Some of these innovations were obscured in later centuries by Roman and Arab influence, but a Punic substratum can still be discerned in Berber culture.

When the first Thalassic traders reached Barbary, the native peoples were growing barley and wheat, and used all the domestic animals (except the dromedary) now found in the area. The vine, pomegranate, almond, walnut, and olive may have been introduced to Barbary by the Phoenicians. Each of these trees is grown by cuttings, a technique previously unknown in northern Africa. A pre-Roman introduction of the oleaster is a necessary part of the thesis that this tree is not really a wild race, for in Roman time a clear distinction was made between cultivated and "wild" trees. As a result of all or part of these introductions, northern Africa began to shift from cereal farming and transhumance to a Thalassic agriculture of terraced orchards and gardens. Barley and wheat remained the staples, but the diet probably came to include a greater variety of vegetables and salad plants. The Carthaginians may have introduced refinements of irrigation technique also.

Another result of Punic influence is that tools tipped with iron replaced implements of wood, stone, and bronze.[illegible] Although evidence is lacking, it may be presumed that stone architecture was adopted in some areas in place of cruder construction with mud bricks, straw, and hides. The family crafts of the Berbers probably were not greatly altered, for the Carthaginians were indifferent craftsmen, and in northern Africa even today there is an almost complete separation between the arts of the countryside and those of the towns. But the rural tribesmen must have had ample opportunity to observe and test new ideas and new techniques. In each tribe there would have been several men who had served the Carthaginians as mercenary soldiers, and many tribal areas were attached, at least partly, to native kingdoms that were under Punic control. Evidence of Punic influence has been recovered at several Roman sites. At Lixus, some megalithic tombs, anterior to the Roman tradition, are clearly Punic. Subterranean tombs

[TEXT CONTINUED ON PAGE 41]

[illegible] For discussion of this possibility see E. W. Bovill, *The Golden Trade of the Moors* (London and New York: Oxford University Press, 1958), pp. 22 ff. [113]

[illegible] It used to be said that northern Africa moved from the Stone Age to the Iron Age without passing through an intermediate era of bronze. It is now known that bronze implements were used in many parts of Barbary at the time of the Phoenician invasion. G. Camps, "Les traces d'un âge du bronze en Afrique du Nord," *Rev. Africaine*, 104 (1960), 31–55. [113]

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/p. 40/

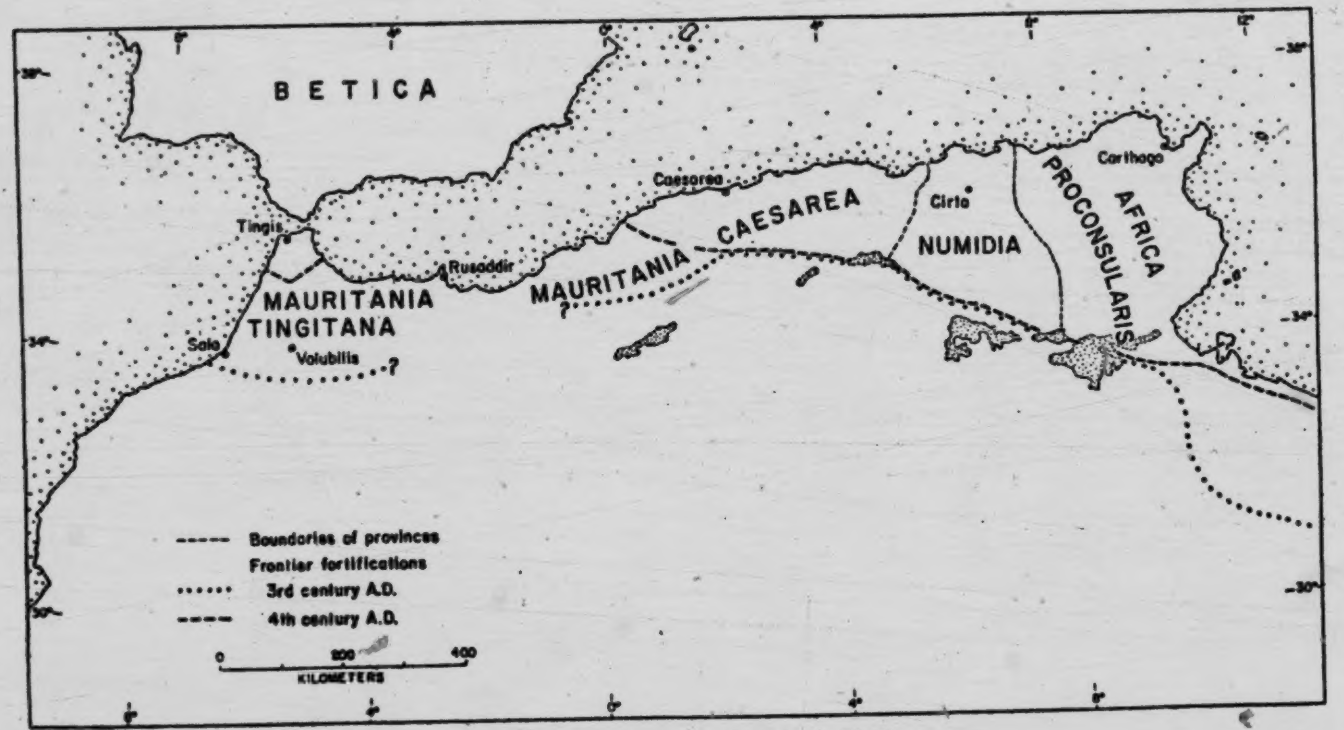
BETICA
MAURITANIA TINGITANA
MAURITANIA CAESAREA
NUMIDIA
AFRICA PROCONSULARIS
Tingis
Rusaddir
Sala
Volubilis
Caesarea
Cirta
Carthago
?
Boundaries of provinces
Frontier fortifications
3rd century A.D.
4th century A.D.
0
200
400
KILOMETERS
38°
34°
30°

Fig. 10. North Africa: Roman provinces and fortifications.

102
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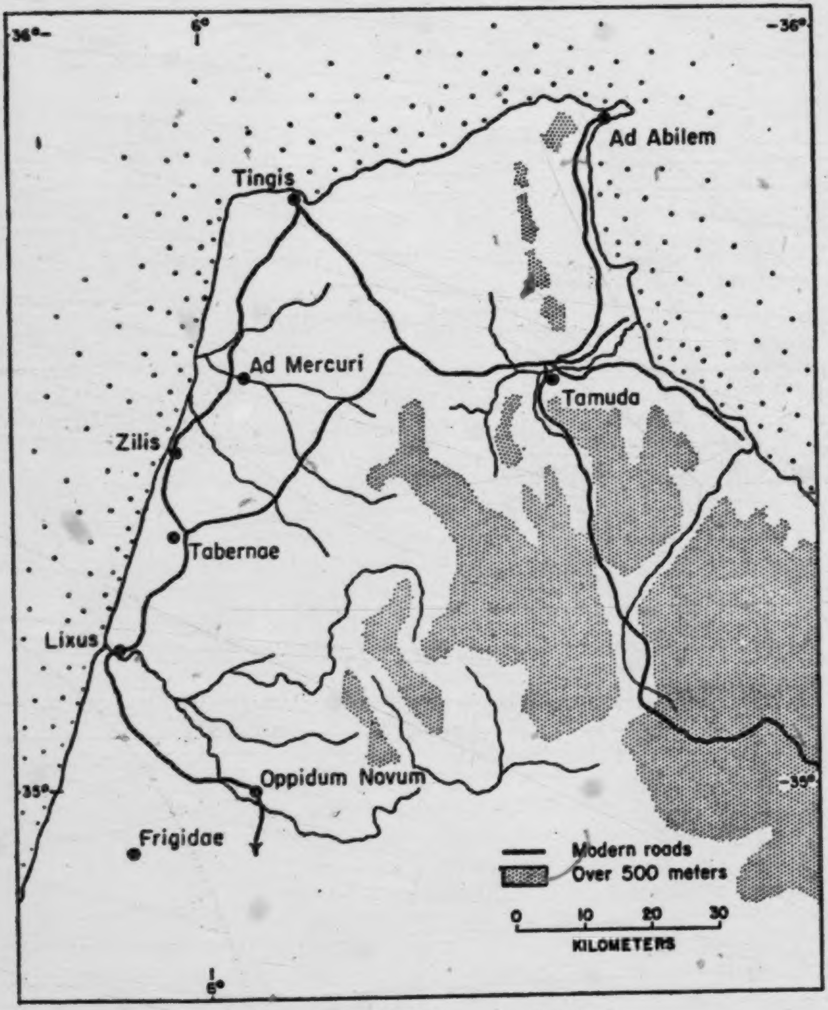
36°
6°
36°
Ad Abilem
Tingis
Ad Mercuri
Tamuda
Zilis
Tabernae
Lixus
Oppidum Novum
35°
35°
Frigidae
Modern roads
Over 500 meters
0
10
20
30
KILOMETERS
6°

Fig. 11. Mauritania Tingitana, fourth century.

175 of the same tradition have been discovered at Taza, and neo-Punic inscriptions appear at several sites. Indeed, at Volubilis the two officials who were in charge of the municipal government at the time of Roman annexation had the Carthaginian title of *suffete* (magistrate).[*]

The effect of Carthaginian influence was to draw northern Africa into the Mediterranean world. Morocco was the last area to be attracted, and the impact of

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[*] For other examples of neo-Punic influence in Roman times see Terrasse, *op. cit.*, I, 47, cited in note 20.

175 Punic civilization was certainly stronger in the littoral zone than in the highlands. Nevertheless, the pattern of life must have changed, even in the more remote areas, between the time of Hanno's voyage and the arrival of the Romans.

After the third Punic war, which ended in 146 B.C., the area directly controlled by Carthage became a Roman province, the Provincia Africa. Long experience in administering conquered territories had taught the Romans that it is difficult to control an expanding frontier. They resolved, therefore, to restrict their occupation to Carthage and its hinterland.[illegible] At first this resolution was accepted, but in time the hostility of the native tribes and the ambition of the Roman commanders led to wider conquest. Numidia, roughly eastern Algeria, was occupied in 45 B.C., and in A.D. 46 the Emperor Claudius created two new provinces, known as Mauritania Caesariensis and Mauritania Tingitana from their capitals Caesarea (Cherchell) and Tingis (Tangier). With these annexations the whole of the north African littoral came under Roman rule.

The extent of Roman control can be roughly delimited by the remains of an elaborate system of frontier defenses (fig. 10). The word for such a system—*limes*—de[illegible]d not only material barriers but also forts, camps, and roads behind the line and outposts and watchtowers in advance of it.[illegible] This system of defense in depth was designed to delay attackers until reserves could be brought to the frontier zone. In Tunisia and eastern Algeria the defensive system was intended to prevent raids by nomads from the pre-Saharan zone—a problem the Romans helped to create by introducing the dromedary.[illegible] In Mauritania and the western sector of Numidia the system was apparently designed to protect the fertile plains from attacks by the unsubdued mountain tribes. Responsibility for the defense of much of the frontier was relegated to retired legionaries or peasant soldiers (*limitanei*), who established semimilitary colonies, comparable to the *kibbutzim* of modern Israel. When they were first organized, most of the *limitanei* were probably recruited from troops already on the frontier. Later, land was given to Latinized barbarians.[illegible]

In Tingitana at the end of the second century, the fortified frontier started on the Atlantic coast, a few kilometers south of Rabat, and then continued eastward between the Rif chain and the Middle Atlas. The easternmost outpost yet discovered is at Bou Hellou, between Fez and Taza. Although archaeological evidence is lacking, there is reason to believe that Tingitana and Mauritania Caesariensis were linked by a military road.

The part of Morocco directly controlled by the Romans was a triangular area bounded by Tingis and Ad Abilem (Ceuta) on the north and by Sala (Rabat)

[illegible] As Terrasse notes, *ibid.*, p. 48, "Rome ne s'était installée en Afrique que pour garder la tombe de Carthage."

[illegible] *Limes* means the whole defensive system, while *fossatum* refers to an artificial barrier consisting of a ditch and wall. Only slight traces of the *fossatum* were known until recently. These were on the frontier of Tingitana near Fez and to the southwest of the Aurès Mountains in Algeria. Air photography has revealed other sections of considerable length. J. Baradez, *Fossatum Africae: vue-aérienne de l'organisation romaine dans le sud-algérien* (Paris: Arts et Métiers Graphiques, 1949). [113]

[illegible] For evidence of the probable date of this introduction, see M. W. Mikesell, "Notes on the Dispersal of the Dromedary," *Southwestern Jour. Anthro.*, 11 (1955), 231–245, reprinted in *Bull. de l'Institut Français d'Afrique Noire*, Série A, 18 (1956), 895–912. [113]

[illegible] B. H. Warmington, *The North African Provinces from Diocletian to the Vandal Conquest* (Cambridge: Cambridge University Press, 1954). [113]

175 and some point near Fez on the south. After the reform of Diocletian in A.D. 285, Tingitana was attached to the diocese of Betica. This transfer doubtless was made because of the difficulty of communication between Tingitana and the rest of Roman Africa. The road going westward from Carthage ended at Caesarea, where the traveler desirous of proceeding farther was forced to put to sea; and he could find no road nearer than Tingis or Ad Abilem, the points of debarkation."[illegible]

From the standpoint of political geography, the main function of Tingitana was to guard the southern flank of Betica. Volubilis was a city of impressive size, and there must have been extensive colonization in the fertile plains of the Gharb. Nevertheless, when it was no longer easy to control the southern base of the triangle, Volubilis was abandoned, and the southern boundary of Tingitana was withdrawn to the line of Wad Lukkus and Wad Lao. This withdrawal, effected toward the end of the third century, reduced Tingitana to one-tenth of its original size.[illegible]

The part of Morocco that remained under Roman control consisted of little more than the coast opposite Gibraltar and a small part of the Atlantic lowland (fig. 10). The principal settlements were confined to the plains and terraces of the littoral zone. There is no evidence as yet of Roman towns or outposts in the highlands, although there may have been scattered colonies on the Rifian coast.[illegible] In northern Morocco the number of suitable urban sites was and is limited. Tingis, Ad Abilem, Zilis, and Oppidum Novum occupied the same sites as the modern towns of Tangier, Ceuta, Arcila, and Ksar al-Kebir. Tamuda and Lixus were only a few kilometers from modern Tetuán and Larache. The close relationship of ancient and contemporary patterns is revealed also by the alignment of Roman settlements along the routes of the modern roads (fig. 11).

The principal functions of the Roman towns probably were similar to those of their modern counterparts. Tingis and Ad Abilem were the great ports of Tingitana and the termini of the roads. Tamuda was a focus of land transportation and the head of navigation for the Río Martín.[illegible] Lixus, at the mouth of Wad Lukkus, must have enjoyed a lively trade, for a long stretch of this river was still navigable in the fifteenth century, when the Portuguese arrived.[illegible] Ad Mercuri, Zilis, Tabernae, and Oppidum Novum served as military posts on the road from Tingis to Sala and Volubilis. There is archaeological evidence of other posts on the roads from Tingis to Tamuda and Ad Abilem.[illegible]

Most of the highland zone was evidently beyond the limits of effective Roman control; the colonies on the Mediterranean coast, with the possible exception of Rusaddir, functioned as ports of call and not as trading outlets for the interior.

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175 [illegible] Raymond Roget, *Le Maroc chez les auteurs anciens* (Paris: Les Belles Lettres, 1924), p. 39.

[illegible] The causes and consequences of this change are described by Warmington, *The North African Provinces*, pp. 70 ff.; and M. Tarradell, "La crisis del siglo III de J. C. en Marruecos," *Tamuda*, 3 (1955), 75–105.

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[illegible] For the names of settlements as yet undiscovered, see P. César Morán and G. Guastavino Gallent, *Vías y poblaciones romanas en el norte de Marruecos* (Madrid: Alta Comisaría de España en Marruecos, 1948).

[illegible] For further information on Tamuda, see M. Tarradell, "Las excavaciones de Tamuda de 1949 a 1955," *Tamuda*, 4 (1956), 71–85.

[illegible] T. García Figueras, *Expedición de los Portugueses al Río de Larache y fundación de la fortaleza de "La Graciosa" en el Lukus* (Larache: Instituto General Franco para la Investigación Hispano-Arabe, 1941).

[illegible] For a preliminary report of the excavation of one such post, see M. Tarradell, "El Benian: Castellum Romano entre Tetuán y Tanger," *Tamuda*, 1 (1953), 302–309.

175 Roman territorial organization seems to have been strikingly similar to the pattern of European occupation during the protectorates. Roman influence, like Spanish influence, must have been considerable in the lowlands, but it is unlikely that many of the mountain tribes were subdued. In Roman time, as in recent years, the principal agents of cultural change would have been tribesmen who had served as mercenary soldiers.

The Roman occupation probably did not have an important influence on the racial composition of the Moroccan tribes. There was no large immigration from Italy during the period of conquest, and after the new provinces were occupied a large part of the Roman army was recruited locally. Even in the cities of Proconsular Africa, where Roman influence was strongest, many names found on inscriptions are merely Latin translations of Berber names.[illegible] Native preponderance in Numidia and Mauritania, where the cities were fewer in number and the proportion of Italian immigrants smaller, must have been even greater. In Roman time, as today, the Rif and Atlas mountains were the areas least affected by foreign influence. Yet it must be remembered that cultural change does not depend on face-to-face relationships. Roman goods and ideas penetrated far beyond the imperial frontiers.[illegible] The extent of Roman influence in northern Africa is illustrated by the presence of coins and implements of the second and third centuries at the tomb of the Tuareg queen Tin Hanan in the heart of the Sahara.[illegible] The Romans' concept of defense in depth and their willingness to recruit barbarians facilitated acculturation.

If it is reasonable to suggest that the basic patterns of cereal farming and pastoral life are anterior to Punic influence, and that horticulture was introduced by the Carthaginians, few agricultural innovations can be ascribed to the Romans. Perhaps their greatest contribution was the perfection of dry farming and irrigation. But most of the crops cultivated by the Romans were already known in northern Africa, and it is safe to infer that the date palm was cultivated in that region before the Romans arrived.[illegible] The Romans probably introduced the dromedary, but the first camels may not have reached northern Morocco until after the Arab invasions.

Roman contributions in metallurgy, architecture, and urban planning are more readily discerned. The *qsar* of the oases, according to Terrasse, retains the outline and often the orientation of the Roman *castrum*, and the *tighremt* with its four towers is nothing but a *castellum* transposed into Berber architecture.[illegible] The general aspect of the fortified hamlets in southern Morocco suggests Egyptian or east African influence, but Terrasse is probably correct when he assumes that many of the details of the *qsar* represent ancient attempts to emulate Roman style.

It is not known when Christianity came to Morocco, but this faith apparently

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175 [illegible] For evidence in support of this point, see Warmington, *The North African Provinces*, pp. 69–
113 75, cited in note 33.

[illegible] For evidence of the extent of Roman penetration, see Sir Mortimer Wheeler, *Rome Beyond the Imperial-Frontiers* (Harmondsworth and Baltimore: Penguin Books, 1955).

[illegible] E.-F. Gautier, "The Monument of Tin Hanan in the Ahaggar," *Geog. Rev.*, 24 (1934), 439–443.

[illegible] This inference is supported by Herodotus' reference (*History*, IV, 183) to "palms of the fruitful kind" in the Fezzan.

[illegible] Terrasse, *op. cit.*, I, 70 ff., cited in note 20

175 persisted long after the termination of Roman control. At Volubilis, epitaphs dated A.D. 599, 605, and 655 prove the survival of Latin and Christian order up to the eve of the Muslim invasion.[45] The extent of Christian expansion beyond the *limes* is difficult to trace, but the rapid expansion of Islam, which raced ahead of most of the Arab innovations, suggests that Christianity may have spread beyond the Roman military and economic frontiers. Arabic writers point to the presence in the eighth century of a Christian community at the foot of the High Atlas,[46] and several tribes in the mountains of northern Morocco still retain notions of Christian ancestry.[47] Most of the Berber tribes still use the Julian almanac, and the Latin names for the months have passed with but slight changes into the Berber tongues; these facts suggest Christian influence, for the association of religion and agriculture is a fundamental aspect of Berber culture. Unconsciously, Moroccans still associate Christianity with Rome, for in Maghribi Arabic the term usually applied to an infidel is "Roumi" (Roman).

In A.D. 429 what was left of Roman authority in northern Africa was challenged by the Vandals. The route of their invasion is unknown. Procopius says only that they "crossed the strait at Gadira (Cádiz) and came to Libya."[48] Some scholars believe that the army was transferred by sea as far as the site of modern Algiers;[49] others trace the invasion through the Taza corridor.[50] In any event, a year after their departure from Spain the Vandals were besieging Hippone (Bone), and within ten years they were masters of Carthage. Once victorious, the Vandals limited their activity to Proconsular Africa, roughly northern Tunisia. Except for occasional contacts during the conquest, it is unlikely that they exerted any influence on the Berber tribes. As Coon remarks, "the popular theory of a Vandal origin of blondism in north Africa is historically unsupportable."[51]

In A.D. 533 a Byzantine army landed on the Syrtic coast. It soon disposed of the Vandals, and within three months the Byzantine commander reported that Africa was "Roman" again. Tangier and Ceuta became Byzantine outposts, but their only function was to guard the Strait of Gibraltar. Little is known of Moroccan history during the half century that remained before the beginning of the Arab invasion. During this interval the Visigoths crossed over from Spain and took possession of Ceuta and part of Ghmara, but their influence probably did not extend beyond the coast.[52]

ARABIZATION

Forays into Cyrenaica and Tripolitania followed soon after the Muslim conquest of Egypt in 640. The conquest of Barbary began thirty years later when Uqbah ibn-Nafi invaded Tunisia, founded Qayrawan, and undertook an expedition toward the west. This expedition had no durable result. Later, when the Byzantines had

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175 [45] The evidence of Christian survival is examined in Warmington, *The North African Provinces*, pp. 76 ff.

113 [46] Terrasse, *Histoire du Maroc*, I, 64.

[47] This tradition seems to be especially strong among the tribes of Sanhaja as-Srair. See Coon, "Tribes of the Rif," pp. 16 ff., cited in note 4.

[48] Procopius, *De Bello Vandalico*, III, 3.

[49] B. J. Kidd, *A History of the Church to A. D. 461* (Oxford: Clarendon Press, 1922), III, 344.

[50] C. Courtois, *Les Vandales et l'Afrique* (Paris: Arts et Métiers Graphiques, 1955).

[51] Coon, "Tribes of the Rif," p. 26.

[52] Ibn Khaldun comments on the Visigoths, but does not mention the Vandals.

175 been eliminated, Berber resistance was broken, and Musa ibn-Nusayr was able, from 703 to 711, to resume the conquest. In Morocco he followed the route of Uqbah, through the Taza corridor, and eventually the Atlantic plains were brought under Umayyad rule. But the progress of Islam was slow. At the end of the eighth century, Christians still lived on the plains, and pagans controlled the highlands.[illegible]

It is useful to think of Arabization as a process carried forward in three overlapping stages. The first stage was the initial contact between the Arab invaders and the native Christians and pagans. The second stage began with the arrival of Arab bedawin in the eleventh century. During the third stage, from the fifteenth to the seventeenth centuries, Arabization was accelerated by the arrival of Andalusian refugees.

It is unlikely that the first Arabs had much contact with the rural tribes. The men who marched with Uqbah and Musa were soldiers, explorers, and missionaries, not rural colonists looking for new land. Arabic triumphed in each administrative center, but the towns of Morocco remained islands of Arabic language and foreign civilization in a sea of Berber tribes.[illegible]

The early restriction of Arabic to the cities is not hard to explain. Between city and country in Morocco there is a chasm without counterpart in the Western world. The Moroccan towns did not grow gradually from small beginnings; they were built by decree. The tribesmen living around such artificial creations could not regard them with any feeling of pride. The new cities, like the Roman settlements, reminded them of the master or even of the foe.[illegible] Prior to the European occupation, all cities were protected by high walls and gates that were closed at night. After the bedawin invasions, Arab tribes were sometimes given land and pasture around the larger cities, with the intention that they would form a defensive ring.[illegible]

If the cities of northern Africa had remained the only centers of diffusion for Arabic, it probably would not have diffused at all. The most effective teachers were the bedawin, who began to move into northern Africa in the seventh century. This movement was headed by the Bani Hillal and Bani Soleim, who had been ejected from the Syrian desert for plundering pilgrim caravans. About 1050 the caliphs in Cairo, enraged at the disobedience of the Sanhajan emirs in Qayrawan, sought to chastise their rebel vassals by launching the bedawin against them. After having conquered southern Tunisia, these rough and illiterate nomads passed through the Saharan Atlas, spread over the Algerian plateaus, and entered Morocco through the Taza corridor. By the end of the fourteenth century they were camped on the Atlantic littoral.[illegible]

The bedawin differed profoundly from the aristocratic adventurers who had conquered the country three centuries earlier. They had no desire to propagate religion or to found cities; their task was to find new pastures for their flocks

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[illegible] W. Marçais, "Comment l'Afrique du Nord a été arabisée," *Annales de l'Institut d'Etudes Orientales*, 4 (1938), 1–32; "L'arabisation des campagnes," *ibid*, 14 (1956), 5–17.

[illegible] Ibn Khaldun, *Histoire des berbères et des dynasties musulmanes de l'Afrique septentrionale* (2d ed., Paris: Paul Geuthner, 1925–1934), I, *passim*.

[illegible] E.-F. Gautier, "Native Life in French North Africa," *Geog. Rev.*, 13 (1923), 27–39.

[illegible] Robert Montagne, *La Civilisation du désert: nomades d'Orient et d'Afrique* (Paris: Hachette, 1947), pp. 262–264.

[illegible] For a detailed study of their migrations, see G. Marçais, *Les Arabes en Berbérie du XI*^e^ *au XIV*^e^ *siècle* (Paris: Leroux, 1913).

175 and new camping grounds. They were numerous enough to compete with the plains-dwelling Berbers for their land, but as bedawin they were unable to dislodge or greatly influence the mountain tribes.

Wherever pastoral Arabs and sedentary Berbers came together, the economic conflict was accompanied by a clash of agrarian democracy with the authoritarian order of pastoral society. The importance of this conflict is suggested by the fact that Arab dialects are confined, even today, to lowland or plateau areas well suited to urbanization and pastoral life. In the highland zones, particularly in the irrigable areas, Berber society was not seriously disturbed. The only important exception to this generalization is the Jbalan sector of northern Morocco, which is well adapted to sedentary life but nevertheless was Arabized at an early date. It must be remembered that Jbala is a passageway between Morocco and Spain, and that many of the troops that took part in the Spanish campaigns were recruited there.

The coincidence of Arabic speech and gentle relief should not be viewed as a simple relation of cause and effect. The plains were better suited to bedawin life, and the bedawin were chiefly responsible for the spread of Arabic speech. During most of Moroccan history the areas of gentle relief coincided with the effective limit of the central government (*bilad al-makhzen*). In many areas the advance of governmental control and Qur'anic law favored the adoption of Arabic speech. In contrast, the rugged terrain of the Moroccan mountains helped to maintain Berber independence.

Some writers have asserted that the Berber-speaking tribes were *driven* to the highlands, and that the dominance of Arabic in the lowlands represents displacement rather than assimilation. From the time of Uqbah and Musa, the Arabians in the army of conquest and among the colonists must have been comparatively few, limited to those in command and in high office. The number of women accompanying the army and the first immigrants was necessarily small. Disease and fighting took their toll. After the fourth generation the Arabian "blood" would have been greatly diluted by intermarriage with native women. Many if not most of the troops that took part in the Spanish campaigns were Berbers from Jbala, Ghmara, and the Rif. In the opinion of one scholar, the veins of the Caliph Abd al-Rahman III (912–961) contained less than a hundredth part of Arabian blood.

The bedawin were more numerous than the first invaders, and moved with their families, but Gautier thinks that they could hardly have numbered more than 200,000, probably less than 2 per cent of the population of northern Africa at that time. After centuries of mingling with Berbers in Libya, Tunisia, and Algeria, it is doubtful that the bedawin who reached the Moroccan coastal plains retained more than a nominal amount of Arab blood. Montagne believes that no more than 10 per cent of the Moroccan population can claim to be of Arabian

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175 On the Arabization of Jbala, see also A. Bernard and P. Moussard, "Arabophones et berbérophones au Maroc," *Annales de Géographie*, 33 (1924), 267–282.

113 Cf. Dupree, "The Non-Arab Ethnic Groups of Libya," p. 33, cited in note 8: "The once-powerful Berbers of North Africa are now principally a marginal, conservative people living in mountain refuge areas, driven there by successive waves of Phoenicians, Greeks, Romans, Arabs, and Europeans."

J. Ribera y Tarragó, *Disertaciones y opúsculos* (Madrid: Imprenta de E. Maestre, 1928), I, 12–35, 109–112.

E.-F. Gautier, *Le passé de l'Afrique du Nord: les siècles obscurs* (Paris: Payot, 1952), p. 429.

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7: Mikesell K-4,5 (1955-1957) 1961

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Jebala MX2
Senhaja MX4

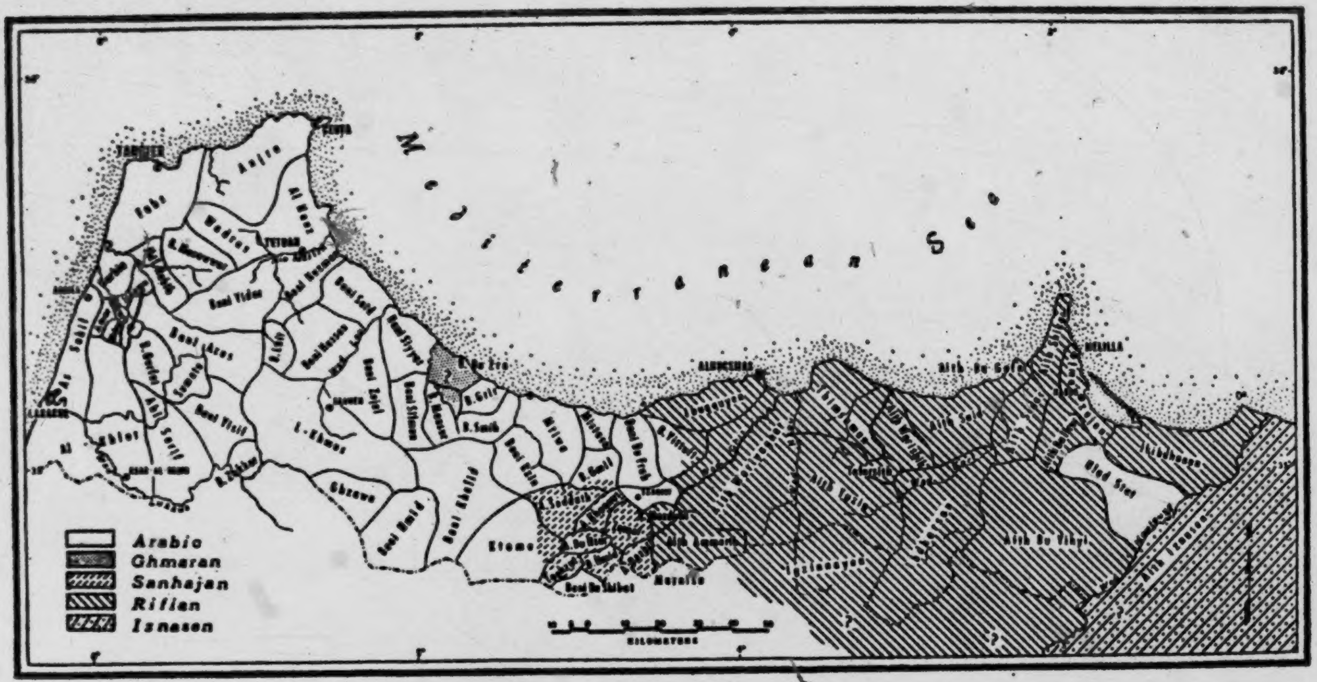
Mediterranean Sea
TANGIER
CEUTA
TETUAN
Anjra
Fahs
Wadras
Beni Aros
Sahil
LARACHE
ALHUCEMAS
MELILLA
Ghzawa
Beni Khalid
Ketama
Aith Ammarth
Aith Waryaghar
Aith Said
Aith Touzin
Aith Bu Yihyi
Kibdhana
Olad Stut
Aith Iznasen
Igzinnayen
Thimsaman
Aith Bu Gafar
Beni Bu Frah
Beni Gmil
Beni Seddath
Ghmara
Metiwa
Beni Zejel
Beni Hassan
Beni Said
Beni Ider
Beni Hozmar
Beni Messara
Beni Zerwal
Al Khlot
Ahl Serif
Beni Issef
Soumata
Beni Bu Shibet
Marnisa
KILOMETERS
Arabic
Ghmaran
Sanhajan
Riflan
Iznasen

Fig. 12. Northern Morocco: distribution of Arabic and Berber speech.

/p. 48/

175 descent.[62] The Andalusian Muslims could hardly have displaced any large group of Berbers, for they settled, almost to a man, in cities and towns. It is reasonable to conclude that the Moroccan highlands remained Berber not because they were a place of retreat but because the drift of Arab influence went around the mountains rather than through or over them. The horticultural skills of the highland Berbers and their intricate social organization suggest stability, not the culture of a refugee population driven to new and unfamiliar environments.[63]

The Christian reconquest of Spain, led by Castile and Aragón, began in 1225. Córdoba fell in 1236, and Sevilla in 1249. Soon Spanish Islam was reduced to the small kingdom of Granada, which had accepted Castile as an overlord. In 1492 Granada itself was taken, and Spanish Islam ceased to exist. Even before the conquest of Granada, many Muslims sought refuge in Morocco. These refugees repeopled most of the Moroccan towns, and provided the Saadians with technical experts and soldiers. Northern Morocco became a center of Andalusian civilization. Some families in Tetuán, Shawen, and Fez still retain keys to their ancestral homes in al-Andalus.

The Andalusian refugees brought a richer and more classical form of Arabic speech. Since most of the immigrants settled in towns, the distinction between urban and rural dialects was intensified. This distinction is still strong. The more elegant city speech is spoken not only in Fez (the great center of Andalusian culture) but also in Rabat-Salé (settled by Andalusians in the seventeenth century) and in Tetuán (most of whose inhabitants came from Ronda in the fifteenth and sixteenth centuries). Taza, Ksar al-Kebir, and Azemmour also have somewhat urbanized dialects, while Tangier and Wezzan show the influence of neighoring tribes. Meknès and Marrakech, perhaps the most extreme examples of country speech, are accordingly looked down upon by their bourgeois neighbors. Thus there is, besides the Arab-Berber distinction, a strong contrast even among Moroccans who are Arabized. No one familiar with the sounds and rhythms of Maghribi Arabic could fail to distinguish between the dialect of Old Fez and the quasi-bedawin speech of the rural tribes.[64]

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191 Several of the tribes shown as Berber-speakers in figure 12 are described as Arabophones in previous work. Disagreement arises from the fact that many tribes are bilingual. When questioned about their language preference, many Berbers reply that they speak only Arabic, but if questioned further they will add that their women and children speak Berber, and that boys do not begin to learn Arabic until they are old enough to attend a Qur'anic school. This is the situation among the Aith Seddath, a tribe often described as bilingual or Arabophone.[65] It is important to note whether merchants or the educated members of a tribe use more than one language, but the linguistic attainments of the elite should not be allowed to obscure the basic pattern of domestic speech. The fact that one Rifian in ten speaks some Spanish or Arabic does not mean that the Rif

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[62] Montagne, *La Civilisation du désert*, p. 265, cited in note 56.

[113] [63] René Raynal, in "Quelques aperçus géographiques sur l'évolution des régions humanes du Maroc," *Hespéris*, Archives Berbères et Bulletin de l'Institut des Hautes-Etudes Marocaines, 39 (1952), 1–16, refers to the Berber mountains as "vieilles régions humaines."

[113] [64] G. S. Colin, "L'Arabe," in *Initiation au Maroc* (3d ed., Paris: Editions d'Art et d'Histoire, 1945), pp. 208 ff.

[113] [65] A. Renisio, *Etude sur les dialectes berbères des Beni Isnassen, du Rif et des Senhaja de Srair* (Paris: Leroux, 1932).

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Senhaja MX4

R 197 [190] should be described as a bilingual zone. Probably not one Rifian woman in a hundred understands Arabic or Spanish, and few Rifian men speak either language correctly.

In northern Morocco the Berber language is represented by three dialects: Rifian, Sanhajan, and Ghmara. Rifian is by far the most important. It varies somewhat from tribe to tribe, but this variation does not hinder communication. The differences in pronunciation are evident as one moves from the Nkour Valley toward Wad Moulouya, particularly in Ikibdhanen. Rifians can understand the dialect of the Aith Iznasen, but they are obliged to use interpreters when they deal with the Sanhajans. The Ghmaran dialect is nearly extinct. Today it is spoken only in Bani Bu Zra and in a few hamlets of Bani Mansur and Bani Grir. The relationship between Ghmaran and the other dialects is not yet clear, but Ghmaran seems to be a distinct dialect, not a variant of Rifian or Sanhajan.[66] Differences in pronunciation may be considerable, even among speakers of the same dialect. The speech of Ktama and Taghzut, for example, is barely intelligible to the Aith Seddath. The degree of difference between Rifian and Sanhajan is probably as great as that between Spanish and Italian. Nevertheless, philologists prefer to recognize only one Berber language, and attribute differences of this magnitude to isolation and the absence of literature.[67]

Berber speech has completely disappeared from the area west of Bani Siyyat, Bani Silman, and Bani Khalid. The progress of Arabization was more rapid in the interior than along the Mediterranean coast. Even today the route from Tetuán to Melilla follows the ridges of the Rifian chain, whereas no road follows the coast east of Wad Lao. The Ghmaran dialect is preserved in an area crossed by deep canyons, and bounded by high mountains and the inhospitable Mediter- S [197] ranean coast. In Sanhaja as-Srair most of the Arabophones occupy land south of the mountain chain. The Bani Bu Shibat and Bani Hmid find it much easier to visit the markets of Marnisa, where Arabic is spoken, than to climb the mountains to reach the main area of Sanhajan speech. In the eastern part of the Rif, Arabic is spoken only along the Moulouya Valley, the route of advance for bedawin tribes moving northward from the Algerian plateaus. The Ulad Stut not only speak Arabic but are of Arabian (i.e., bedawin) descent.[68] This claim can also be made by the Khlut, who moved into the Atlantic lowland during the fourteenth century.[69]

R [175] The first to abandon Berber (or Latin) speech were the peoples of the Tingitanian peninsula and the plains near Fez. After the collapse of Muslim Spain the same areas became havens for Andalusian refugees. From these two centers Arabic speech and Islamic culture gradually moved into the highlands. This movement is still in progress. In fact, Moroccan independence will cause an acceleration, for the language of the Prophet now has political as well as religious sanction. S 197 The Ghmaran dialect will become extinct in a generation, and in another generation or two the Sanhajan dialect may also disappear. R [197] In Ktama, Sanhajan speech is retained only in the inaccessible valley of Abd al-Ghaya, between Adrar

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R [113]

[66] G. S. Colin, "Le parler berbère des Gmara," *Hespéris*, 9 (1929), 43–58.

[67] Basset, *op. cit.*, in note 9.

[68] Marçais, *op. cit.*, in note 57.

[69] According to D. M. Hart (personal communication), only 9 out of 171 place and lineage names in the Khlut area are indisputably Berber.

S 197 Tidighin and Adrar Taghzut.[18] The rest of the Ktama, who are more exposed to outside influences, have abandoned Sanhajan speech.

R S 197 In Morocco as a whole, Berber is still the language of the mountains, but most of the foothill zone has been Arabized. This generalization applies to the Sanhajan tribes south of the Rifian chain and to the southern parts of Igzinnayen, Ibdharsen, and Aith Bu Yihyi. Since the transition is from Berber speech to bilingual habit and then to Arabic alone, the tribes that are now bilingual indicate the direction of current and future change. In the areas of Ghmaran and Sanhajan speech the traveler has no trouble finding someone who can understand Arabic. The same comment can be made for the southern and eastern margins of the Rif. But as one moves from the marginal areas toward the heart of the Rif one finds fewer and fewer persons who speak Arabic; in Aith Wariyaghar and Thimsaman it is understood only by the educated elite.

R 175 771 Adoption of Arabic speech is only one aspect of Arabization. Many Berber groups resisted Islam at first, but by two or three centuries after the Arab invasion they were all Muslims, at least in name. Yet, while eventually converting the Berbers to Islam, the Arabs failed to control them politically. The Berber attitude toward new ideas is and presumably was one of partial or conditional acceptance. Pre-Islamic traditions emphasizing the Berber spirit of freedom and self-sufficiency could not be completely erased. Rifians and Sanhajans promptly submitted to Allah, but they did not welcome Arab tyranny or the demand of the central government for taxes. Berber tribesmen eagerly responded to any appeal for a *jihad*, or holy war, but in accepting Islam they never abandoned faith in animism and in their local saints. These two features still give a distinctive flavor to Moroccan Islam, especially in contrast to the puritanical dogma of Saudi Arabia.

R 175 177 Islamization and Arabization cannot be regarded as omnipotent forces capable of erasing Berber culture. A case in point is the reluctance of the Berbers to accept the Arab pattern of tribal organization. When the European occupation began, most of the mountain tribes maintained their tradition of government by popular assemblies. Prior to the European occupation, the extent of the Arab form of government was no larger than that of the central government itself. With no roads in the modern sense and with overland travel limited to riding and pack animals, it was impossible for any sultan to keep all his domain under effective control. The land of government (*bilad al-makhzen*) was confined to the lowlands where communications were easy to establish and maintain. The foothill zones retained their assemblies, although tribute was paid by some tribes through the intermediacy of the *qaid* of a subdued tribe. The boundaries of the *bilad al-makhzen* were forever fluctuating, depending on the strength or weakness of the central government, but the main areas of dissidence (*bilad as-siba*) remained independent until the advent of European control.

R 177 175 779 [788] Berber tribes generally accepted the Five Pillars of Islam: profession of faith, prayer, almsgiving, fasting, and pilgrimage. But each "pillar" was modified somewhat to suit local traditions and tastes. Many Berbers think of pilgrimage in terms of their local shrines. Indeed, according to some Moroccans, seven succes-

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[18] The Sanhajan dialect is spoken also at Ain Ighumad, on the north slope of Adrar Dahdoh, but this sector of Ktama has its main contact with the Berber-speakers of Aith Seddath.

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175 sive pilgrimages to the tombs of both Mulai Idris and Mulai Abd al-Salam are
777 equal to one to Mecca.[71] The fast of Ramadan is strictly observed even in the
(788) remote highlands, but many Berbers are extremely casual about prayer, and
(782) the idea of almsgiving, in the sense of an income or head tax, was never accepted
(735) by free tribes. On the other hand, most tribes promptly accepted the Qur'anic
(651) distinction between what is *halal* (clean, or permitted) and *haram* (unclean, or
(783) forbidden). Thus carnivorous animals and birds of prey were excluded as food,
and also eels and mackerel, since they were supposed to be unclean feeders. Con-
(262) sumption of wine ceased, although vineyards are still numerous and raisins are an important food. A generation ago the Berbers probably hunted the wild boar and may even have kept domestic pigs, but there is evidence that the latter practice continues.[72]

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241 There is nothing blind or unreasonable about Berber conservatism. Once the value of an innovation has been established, it is accepted without reservation. Berber agriculture today is a blend of crops and methods derived from diverse contacts during millennia. Some of the contributions of the Arabs are easy to discern; others are not. The Romans and Phoenicians both contributed to North African skill in irrigation, but the Arabs added refinements in technique.[73] It is not known whether the Arabs or the Romans introduced the Persian system of underground infiltration tunnels (*foggara*), but the Arabs seem to have brought this system to Spain.[74] It cannot be asserted that the Arabs introduced the date palm, for there is reason to believe that palms were cultivated in the Fezzan in classical time.[75] The Latin name for the pomegranate, *Malum punicum* (apple of Carthage), suggests that it was cultivated in northern Africa long before the Arabs arrived. Barley and wheat, the basic cereals, were cultivated before the arrival of the Phoenicians. The Arabs may have been responsible for the introduction of hard wheat (*Triticum durum*), which is still used for semolina. *Triticum dicoccum* has been found in the Roman ruins of Timgad and Djemila.[76] The ubiquitous wheat at present is *T. aestivum*. The initial dispersal of rye seems to have been as a weed in wheat fields, and it was probably carried to northern Africa by the Phoenicians or the Romans. Sorghum was cultivated in eastern and west-central Africa in Neolithic time. The races of sorghum now cultivated in Morocco (*Sorghum vulgare ssp. dura* and *ssp. cernuum*) presumably originated in Egypt or the Upper Nile; it is not known when they arrived in Barbary. The introduction of barley may have taken place in prehistoric time, perhaps when the Berbers themselves arrived. The Arabs may have been responsible for new dispersals of the dromedary (which had been brought to Tunisia by the Romans), but the other domestic animals were known throughout northern Africa in Neolithic time.

Thus the basic elements of north African agriculture were already present

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(113) [71] D. M. Hart, "An Imarah in the Central Rif: The Annual Pilgrimage to Sidi Bu Khiyar," *Tamuda*, 4 (1957), 239–245.

[72] Coon, "Tribes of the Rif," p. 41, cited in note 4.

[73] The Spanish word for "irrigation ditch," *acequia*, shows little change from the Arabic *al-saqiyah*.

(113) [74] G. B. Cressey, "Qanats, Karez, and Foggaras," *Geog. Rev.*, 48 (1958), 27–44.

(113) [75] Herodotus, *History*, IV, 183. See also Aug. Chevalier, "Les productions végétales du Sahara," *Revue de Botanique Appliquée et d'Agriculture Tropicale*, 12 (1932), 711 ff.

(113) [76] André Haudricourt and Louis Hedin, *L'Homme et les plantes cultivées* (4th ed., Paris: Gallimard, 1943), p. 115.

175 177 241 when the Arabs arrived. But the Arabs introduced a number of additional crops: rice (Sp. *arroz;* Ar. *al-aruzz*), the apricot (Sp. *albaricoque;* Ar. *al-barquq*), and cotton (Old Sp. *coton;* Ar. *al-qutn*).[77] The Arabs brought the bitter or Seville orange, but the sweet or common orange was introduced by the Portuguese from India.[78] The Arabs also brought the artichoke (from the eastern Mediterranean), spinach (from Persia), sugar cane (probably from India), the mulberry (originally from China), pepper, ginger, saffron, and parsley. Hemp (*Cannabis sativa*), the great cash crop of the Sanhajan highlands and the object of a lively contraband trade between Spanish and French Morocco, may also have been carried to Barbary by the Arabs. In an indirect sense the Arabs may be credited with the introduction of a number of New World plants, for many of the Spanish Muslims did not leave al-Andalus until after the final order of expulsion in 1609. By that time Europeans were familiar with the agave, opuntia, tomato, and the great American crop combination of maize, beans, and squash.

MOROCCAN JEWS

175 563 Of the Hebrew people in Morocco, the largest and most prosperous group are the Sephardic Jews who were driven out of Spain after the reconquest of Andalusia. A second, quite different group was already settled in the country when their co-religionists arrived.

The Arab chroniclers state that Jews were in Morocco at the time of the first Muslim invasion. They may have arrived with the Phoenicians or the Romans, for Hebrew scholars believe that some of their religious practices are pre-Talmudic.[79]
563 Today most of the original Jews inhabit ghettos (*mellah*)[80] in the cities, but a few are scattered among the rural tribes. The latter usually pay tribute to the tribesmen with whom they live. Many are caravan men who travel with mule and donkey trains into the less accessible parts of the country. Others are tinkers and petty traders, while many of the prosperous urban Jews are moneylenders, jewelers, and tailors. A small but interesting group cultivates small plots in the High Atlas, and speaks Berber domestically. These "Berber" Jews, like the peasant Jews of Yemen, the Jewish highlanders of the Caucasus, the Falasha of Ethiopia, and the Turkish-speaking Jews of the Crimea, present a difficult problem for historical research.[81] They may be descendants of ancient immigrants, but it seems more likely that they are descendants of indigenous peoples who were converted to Judaism at some remote time.

175 563 When the Sephardim arrived in Morocco they negotiated an ordinance as to their status, which also contained rules laid down for the guidance of their own conduct, no doubt out of fear that contact with the more primitive Moroccan Jews might compromise their tenets. The Sephardim had already abandoned

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(113) [77] Names from P. K. Hitti, *History of the Arabs* (New York: The Macmillan Co., 1951), p. 528.

[78] "Orange" comes from the Spanish *naranja* through the Arabic *naranj* and the Persian *narang*. "Lemon" is the Arabic *laymum* and the Persian *limun*. *Ibid.*, p. 351.

(113) [79] For clarification of this point, see Hahum Slouschz, *Hebraeo-phéniciens et Judeo-berbères* (Paris: Leroux, 1908); and André Chouraqui, *Les Juifs d'Afrique du Nord* (Paris: Presses Universitaires de France, 1952).

[80] *Mellah* is the Arabic word for "salt." The usual explanation for this association is that Jews were once assigned the task of preserving the heads of the sultan's enemies so that they could be put on display.

(113) [81] A. J. Toynbee, *A Study of History* (London: Oxford University Press, 1934), II, 257, 402-412.

175 polygamy, which is still practiced by some of the native Jews. Keen businessmen,
563 organizers of remarkable ability, and excellent linguists, the Sephardim played an important role as middlemen in the initial contacts between Europeans and Moroccans. European protection brought a distinct improvement in their social and economic status. They were particularly active in banking, since the Qur'an enjoins believers from engaging in usury. In Tangier, Jewish bankers attained remarkable privilege and affluence. On the other hand, none of the Moroccan Jews enjoyed true citizenship, and in the days before European protection they were subject to Qur'anic law, which does not recognize the oath of a Jew.

As a consequence of European protection, the Sephardim became more Spanish or French than Moroccan. Differences in dress and speech still distinguish this group from the older and more backward Jews. Only the more conservative Jews cling to the traditional black skullcap. The Sephardim use Maghribi Arabic for commercial purposes, but prefer to speak Spanish or French among themselves. The original Jews speak Berber or Arabic, depending upon the location of their homes and the circumstances of their livelihood. Among them, as among the Sephardim, Hebrew is only a ritual language. Neither the Sephardim nor the more conservative group is prominent in the rural districts of the northern zone.
(162) The latest census of Spanish Morocco lists 8,062 Jews, of whom only 180 are described as rural.[illegible]

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(113) [illegible] *Anuario estadístico, 1952–53* (Madrid: Instituto Nacional de Estadística, 1955), p. 40.

CHAPTER IV

EUROPEAN INTERVENTION

175 ATTEMPTS to gain control of the Moroccan littoral began in the fifteenth century, at the dawn of the great age of European expansion. The first expeditions to the Moroccan shores were Spanish, but later, as a result of treaties between the two nations, the coast to the west of Peñon de Vélez was reserved for the Portuguese.

PORTUGUESE ACTIVITY

At a time when their ships were skirting the coasts of Africa, the Portuguese would naturally be tempted to set foot in a country so near.[1] During the fifteenth century they established forts at Ceuta (1415), Ksar as-Srair (1458), and Arcila and Tangier (1471); but the strong resistance of the Jbalan tribesmen made it impossible for them to move inland. So they made their greatest effort farther south, on the Atlantic coast. In 1469 a fortress—which came to be known as Casa Branca (whence the modern Casablanca)—was built at Anafe. In 1489 the Portuguese established the fort of Graciosa on the banks of Wad Lukkus, and in 1505 built the fortress of Santa Cruz de Aguer (Agadir). Castello Real (Mogador) was founded in 1506, and two years later another stronghold was established at Safi. In 1513 and 1514 Azemmour and Mazagão (Mazagan) were fortified. By the middle of the sixteenth century the Portuguese controlled a long strip of the Atlantic coast, and had made raids as far as Marrakech.

The Portuguese occupation, however, was threatened in 1541, when the Moroccans captured Santa Cruz. The Portuguese abandoned Safi, Azêmmour, and Ksar as-Srair soon thereafter, and in 1580 evacuated Arcila. At the turn of the century they retained only Mazagan, Tangier, and Ceuta. The brevity of their occupation can be attributed to the restricted nature of their operations and the hostility of the Moroccans. The Portuguese, like the Carthaginians (but unlike the Romans), made no attempt to establish a system of defense in depth.[2] Even before the Moroccan counterattacks, Portuguese settlement was confined to the littoral zone (fig. 13). The disastrous defeat of the Portuguese at Ksar al-Kebir in 1578 marked the downfall of the last crusade of Mediterranean Christianity, and the beginning of a Moroccan recovery consolidated by ransom money and then by victories in the Sudan.[3] For a time Morocco seemed to be a great power, and the countries of western Europe were reluctant to plan new aggressions. The net effect of the Portuguese adventure was to raise still higher the wall between Europe and Barbary. The Moroccans, previously at war among themselves, united to repel the infidels. The consequence of this struggle was that no enduring economic or social contact could be made between Moroccans and Europeans. Morocco with-

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[1] The motives of the Portuguese adventure are considered by Marcel Bataillon, "Le rêve de la conquête de Fès et le sentiment impérial portugais au XVI^{e} siècle," in *Mélanges d'études luso-marocaines dédiées à la mémoire de David Lopes et Pierre de Cenival* (Lisbon: Portugalia Editora, 1945).

[2] For an interesting study of Portuguese defenses, see A. L. Guevara, *Arcila durante la ocupación portuguesa (1471–1549)* (Tangier: Instituto General Franco para la Investigación Hispano-Arabe, 1940).

[3] On the causes and consequences of the battle, see E. W. Bovill, *The Battle of Alcasar* (London: Batchworth Press, 1952).

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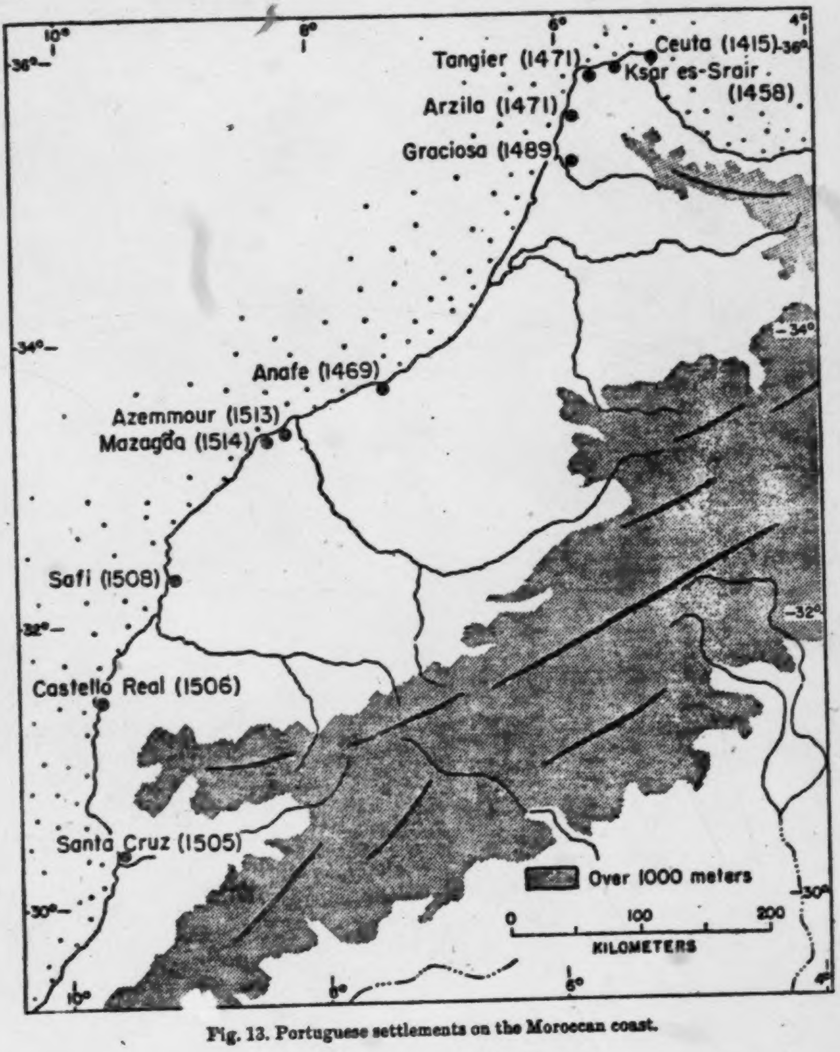
10°
8°
6°
4°
36°
34°
32°
30°
Ceuta (1415)
Tangier (1471)
Ksar es-Srair (1458)
Arzila (1471)
Graciosa (1489)
Anafe (1469)
Azemmour (1513)
Mazagda (1514)
Safi (1508)
Castello Real (1506)
Santa Cruz (1505)
Over 1000 meters
0
100
200
KILOMETERS

Fig. 13. Portuguese settlements on the Moroccan coast.

175 drew into an isolation within which fermented a religious revival based on a violent and intractable xenophobia.

SPANISH ACTIVITY

While the Portuguese were settling on the Atlantic coast, the Spanish were attacking the remaining shores of Barbary. At the beginning of the sixteenth century they captured Mers al-Kebir, Oran, and Bougie, and established themselves at the Peñón of Algiers, with the town under their cannons. But the Spanish soon

175 became involved in more important adventures in the New World, and the Ottoman Turks, then in the midst of their last burst of offensive power, captured the presidios east of Oran. The Spanish never relinquished control of their outposts on the Moroccan coast. Melilla, annexed in 1471, and Ceuta, ceded by Portugal in 1668, are still governed as integral parts of Spain (*plazas de soberanía*).[4]

From the sixteenth to the twentieth century, the Spanish garrisons were under siege.[5] The positions held by the Spanish show an abiding concern for defense. Ceuta and Melilla are on rocky promontories forming natural strongholds. Peñón de Vélez and Peñón de Alhucemas are rocky islets, easy to defend but poor positions from which to launch an attack.[6] At the beginning of the present century the garrisons of the two islets were forced to obtain food and drinking water from Málaga.[7] During the nineteenth century the Spanish made several efforts to enlarge their holdings, but none had enduring success. In 1859 it took an army of Spaniards six months to reach Tetuán from nearby Ceuta.[8] The siege of Melilla was not broken until 1909. Seven years after the proclamation of Spanish protection, it was not safe to travel from Tetuán to Tangier. Shawen remained closed to infidels until 1920. Ifni, ceded to Spain in 1860, was not permanently occupied until 1934.

PARTITION AND "PACIFICATION"

The secret Franco-Spanish agreement of 1904, the Algeciras agreement of 1906, and the Franco-Moroccan treaty of 1912 divided Morocco into areas of French and of Spanish custody,[9] but neither power was able to exercise complete control of its zone. In French Morocco early occupation was restricted to the most accessible regions—the Moroccan continuation of the Algerian steppe, and the Atlantic coastal plains. In 1914 the Taza corridor was occupied, and tracks were laid for a railroad to link Morocco with Algeria and Tunisia. But the First World War curtailed French activity, and at the end of the war French control was still restricted to the eastern plateaus and the Atlantic coastal plains.[10] Occupation of the High Atlas and the pre-Saharan zone was not completed until 1934, and within six years of that date French authority in Morocco was seriously compromised by the German conquest of the motherland. Order was reëstablished after the war, but a new and final rebellion began in 1955, when most of the Rif and Atlas mountains were again described as "zones of insecurity."

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[4] Ceuta is administered as a part of Cádiz province, while Melilla is controlled from Málaga. During the protectorate both cities were separated from Spanish Morocco by customs barriers. Peñón de Vélez, Peñón de Alhucemas, and the Chafarinas are also governed as integral parts of Spain.

175 [5] For an account of one siege of Melilla, see F. Sebastián de Miranda, *El sitio de Melilla de 1774 a 1775* (Tangier: Instituto General Franco para la Investigación Hispano-Arabe, 1939).

113 [6] The standard history of the two islets is by Rafael Pezzi, *Los presidios menores de Africa y la influencia española en el Rif* (Madrid: Establecimiento Tipográfico Fortanet, 1893). See also D. Bacaicoa Arnaiz, "El Peñón de Vélez de la Gomera en 1791," *Tamuda*, 3 (1955), 197–230.

[7] *Instructions nautiques sur le Maroc, l'Algérie et la Tunisie*, Service Hydrographique de la Marine, Publ. 801 (Paris: Imprimerie Nationale, 1899), pp. 53, 58.

[8] W. B. Harris and W. Cozens-Hardy, *Modern Morocco: A Report on Trade Prospects, with Some Geographical and Historical Notes* (London: Bank of British West Africa, 1919), p. 28.

[9] The different delimitations of the two protectorates are shown in *Atlas histórico y geográfico de Africa española* (Madrid: Dirección General de Marruecos y Colonias and Instituto de Estudios Africanos, 1955). See also George F. Deasy, "Spanish Territorial Boundary Changes in Northwest Africa," *Geog. Rev.*, 32 (1942), 303–306.

[10] *Carte des étapes de l'occupation française* (Rabat: Institut Géographique National, Annexe du Maroc, 1934).

175 The Spanish experienced even greater difficulty in their zone. The area between Wad Moulouya and Wad Kert was occupied in 1919, ten years after the siege had been lifted at Melilla. But at this time the Rifian highlands were still under tribal rule and most of Jbala was controlled by the brigand Raisuli.[11] When it (648) seemed that the Spanish would at last be able to begin large-scale offensive action, they were defeated by the Rifian forces of Abd al-Krim.[12] Thanks to French intervention, the Rifian rebellion was suppressed in 1926, but the impoverished Spaniards were unable to bring their protectorate under effective control. The northern zone was completely neglected during the Spanish Civil War (1936–1939). Efforts to organize and develop the zone began in earnest only after the end of the Second World War, and these efforts were frustrated when Morocco regained its freedom in 1956.

These remarks are necessary to provide a proper focus for any image evoked by the expressions "French" or "Spanish" Morocco. Yet economic and cultural influence do not depend upon military occupation and the exercise of formal power. A decade before the Spanish gained control of Jbala, tribesmen of this province were wearing undergarments and waistcoats made of cotton spun at Manchester and Roubaix. When Sidi Muhammad ben Abdullah founded Mogador in 1765, he hoped that the new town would serve as a center for European traders and consuls. At the beginning of the twentieth century, eight ports—Tetuán (Río Martín), Tangier, Larache, Salé, Casablanca, Mazagan, Mogador, and Agadir—were open to foreign trade, and each received commodities destined to become important in Moroccan life. Tea, the foundation of Moroccan hospitality, was introduced by the English in the eighteenth century.[13] Tobacco came later, also as an article of European trade.[14] Spanish currency was widely circulated long before the Spanish themselves gained power. In his account of Peñón de Vélez, Leo Africanus relates that "Venetian galleys used to resort unto this isle, and to exchange their wares for the wares of the inhabitants, and sometimes to buy for ready cash."[15] Perhaps the best indication of the extent of European influence in northern Africa is the use by native peoples of a large number of European words.[16] The technical vocabulary of the fishermen on the Tunisian coast includes terms derived from Spanish, Catalan, various Italian dialects, and Maltese.[17]

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175 [11] On Spain's difficulties with Raisuli, see W. B. Harris, *Morocco That Was* (Edinburgh and London: Blackwood and Sons, 1921).

113 [12] The Rifian uprising became a major revolutionary war on July 21–22, 1921, when a large force under General Silvestre was defeated at Anual. For a full account of the war, see W. B. Harris, *France, Spain and the Rif* (London: Edward Arnold, 1927).

[13] A. Leriche, "De l'origine du thé au Maroc et au Sahara," *Bull. de l'Institut Français d'Afrique Noire*, Série A, 15 (1952), 731–735; J.-L. Miège, "Origine et développement de la consommation du thé au Maroc," *Bull. Economique et Social du Maroc*, 71 (1956), 377–398.

[14] Berthold Laufer *et al.*, "Tobacco and Its Use in Africa," *Field Mus. Nat. Hist., Anthro. Leaflets*, 29 (1930).

[15] Leo Africanus, *The History and Description of Africa* (London: Hakluyt Society, 1896), II, 519.

[16] Muhammad ibn Azzuz Hakim, *Glosario de mil quinientas voces españolas usadas entre los Marroquíes en el arabe vulgar* (Madrid: Instituto de Estudios Africanos, 1933); Mohammed Hadj-Sadok, "Dialectes arabes et francisation linguistique de l'Algérie," *Annales de l'Institut d'Etudes Orientales*, 13 (1955), 61–97.

[17] A. Gateau, "Introduction à l'étude du vocabulaire maritime en Tunisie," *Rev. Africaine*, 87 (1946), 140–183.

SPANISH MOROCCO CIRCA 1955

000 Figure 14 gives some indication of the distribution of Spaniards and the material results of their efforts to control and exploit the northern zone. Settlements, mines, and roads were concentrated in the eastern and western extremities of the zone, and there is meager evidence of Spanish enterprise in the central highlands. Only a small area was used for commercial agriculture.

The overwhelming majority of the Spanish population was concentrated in cities and towns (table 2).[A] In 1950 only 5,000 Spaniards out of a total of 85,000 for the protectorate lived in rural areas. Indeed, one Spaniard in three lived in Tetuán, and the Spanish population of Tangier (30,000), Ceuta (50,000), and Melilla (70,000) was nearly twice as large as that of the protectorate as a whole.[18] Spaniards outnumbered Muslims only in Alhucemas and Castillejos.[19] This fact suggests that Spanish settlement was confined mainly to the established urban centers, and that little effort was made to found new towns.

As the data in table 3[B] indicate, only five or six of the towns that were founded by the Spaniards could have exerted marked influence on the surrounding countryside. In fact, Targist and Alhucemas were the only new towns to exert such influence, for Rincón was an army post, and Segangan, Castillejos, and Río Martín were mere adjuncts of Melilla, Ceuta, and Tetuán. In each urban center, Spanish and Muslim communities were in direct contact, but the traditional schism between town and country checked the extension of Spanish influence just as earlier it had retarded Arabization.

Spanish officials made no effort to encourage colonization by their countrymen, and the Spaniards who did emigrate were not allowed to compete with the Moroccans as manual laborers. Rural colonization was discouraged. In the last year of the protectorate, commercial agriculture was concentrated in the valley of Wad Lukkus, where the Compañía Agrícola del Lukkus had about 15,000 hectares of land under cultivation. Minor developments, with irrigation, had also been undertaken in the plains around Nador and Zaio, and in the deltas of Río Martín, Wad Lao, and Wad Nkour.[20] But, as figure 14 indicates, the acreage allotted to commercial agriculture was only a small part of the zone.

It would have been difficult for the Spaniards to expand their operations, for there are few plains in northern Morocco, and the Mediterranean streams are short and have extremely variable flow. The Wad Lao dam has an irrigation potential of 15,000 to 20,000 hectares, but the flood plain of the stream amounts to only 2,000 hectares. The Spanish policy was to concentrate on development of hydroelectric power. The Wad Lao project will eventually provide power for Tetuán, Ceuta, Larache, and Ksar al-Kebir, cities that are now dependent on

[TEXT CONTINUED ON PAGE 61]

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[113] [18] The figure given for Tangier is an estimate by the Spanish consulate. The source of the other figures is the *Resumen estadístico de Africa española* (Madrid: Dirección General de Marruecos y Colonias and Instituto de Estudios Africanos, 1954).

[19] I use the past tense because the Spanish population of many of these towns decreased substantially after the termination of the protectorate in 1956. There are probably no more than a dozen Spaniards still living in Targist, and there may no longer be any Spaniards in Puerto Capaz (now called al-Jabha).

[113] [20] On irrigation see J. Karst, "Les aménagements hydrauliques des provinces du nord du Maroc," *Bull. Economique et Social du Maroc*, 73 (1957), 5–11; and J. M. Houston, "The Significance of Irrigation in Morocco's Economic Development," *Geog. Jour.* 120 (1954), 314–328.

A, B, [See p. 61--Analyst]

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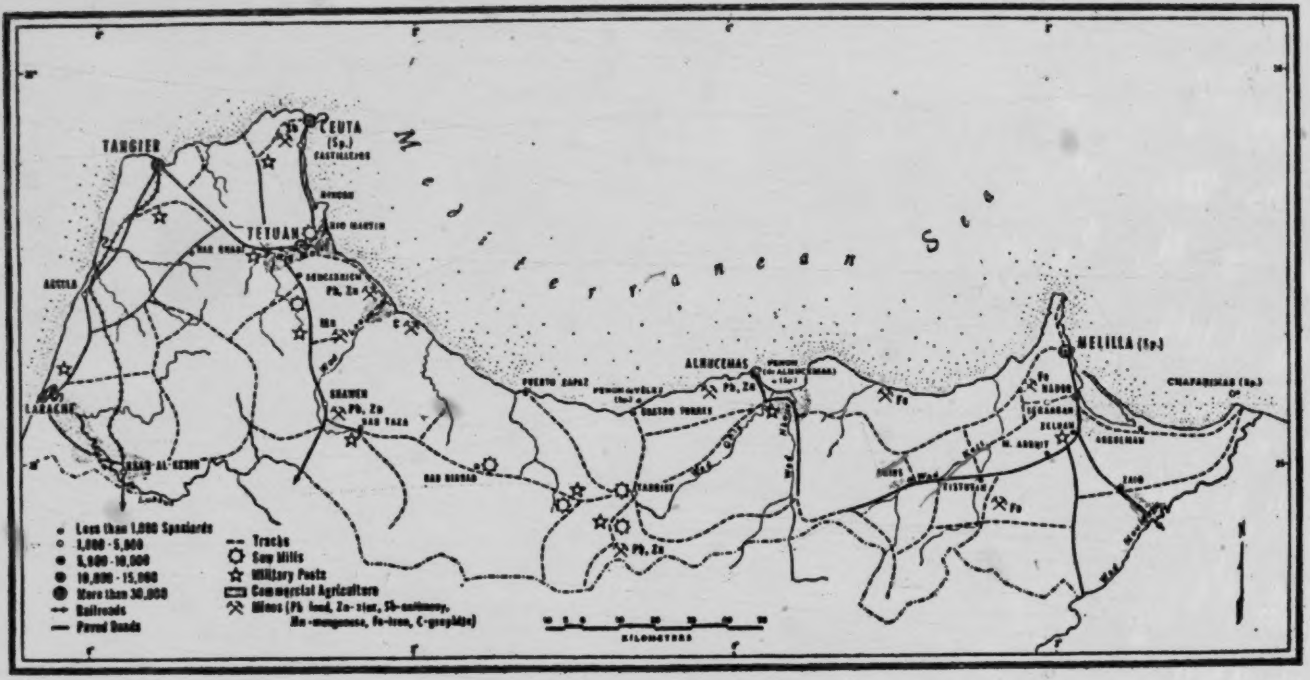
Mediterranean Sea
TANGIER
CEUTA (Sp.)
CASTILLEJOS
TETUAN
RIO MARTIN
ARCILA
LARACHE
XAUEN
BAB TAZA
Pb, Zn
Mn
Fe
ALHUCEMAS
MELILLA (Sp.)
CHAFARINAS (Sp.)
NADOR
ZELUAN
Less than 1,000 Spaniards
1,000 - 5,000
5,000 - 10,000
10,000 - 15,000
More than 30,000
Railroads
Paved Roads
Tracks
Saw Mills
Military Posts
Commercial Agriculture
Mines (Pb lead, Zn-zinc, Sb-antimony, Mn-manganese, Fe-iron, C-graphite)
KILOMETERS

Fig. 14. Spanish Morocco in 1955.

6

000 thermal power. The joint Spanish-French Moulouya scheme has the same major objective, although some of the water impounded by the two dams will be used for irrigation.[n]

TABLE 2

Urban Population, 1950

	Spaniards	Muslims
Tetuán	29,232	47,182
Larache	12,409	28,166
Nador	8,506	13,313
Albucemas	7,148	3,541
Castillejos	4,199	569
Ksar al-Kebir	3,350	27,056
Arcila	2,554	10,752
Shawen	2,446	11,099
Targist	1,035	1,965
Totals	70,879	143,652

Source: *Resumen estadístico de África española* (Madrid, 1954).

TABLE 3

Population of Towns Founded by the Spanish, 1950

	Spaniards	Muslims
Alhucemas	7,148	3,541
Castillejos	4,199	569
Río Martín	1,840	2,013
Segangan	1,128	911
Targist	1,035	1,965
Rincón	973	966
Monte Arruit	485	289
Zaio	320	112
Zeluán	194	225
Puerto Capaz	114	604
Totals	17,438	11,195

Source: See table 2.

At least 70 per cent of the large trade deficit of Spanish Morocco was made up of food imports. Cotton and hemp (*Cannabis sativa*), the main cash crops, were consumed within the zone. Citrus fruit, melons, pimento, lumber, cork, and palmetto fiber were shipped abroad, but all of these exports probably did not pay for the large imports of breadstuff, sugar, and tea. In most of northern Morocco little could have been done in agricultural development even if Spain had been more adequately endowed, for the mountain tribes learned centuries ago how to grow the maximum amount of food on tiny terraces, and the small size of their fields discouraged mechanization.

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[113] [n] This project began in 1946. The first dam, Mechra Homadi, was completed in 1956 and the second, Mechra Klila, in 1960. J. Karst, "L'équipement des travaux publics dans les provinces du nord," *Bull. Economique et Social du Maroc*, 78 (1958), 211–224.

000 The pattern of colonization was different in the French zone.[22] Drawn by the classic motivations of the time—trade, new land, promise of quick profits, adventure, and dissatisfaction with conditions at home—French colonists poured into Morocco by the thousands. In each of the main areas of *colon* activity—i.e., the plains of the lower Sebou, the Gharb, and the area around Oujda—European colonization necessitated displacement of native farmers and pastoralists. The resulting confusion and conflict were important factors in the development of Moroccan nationalism.[23] In 1955 French settlers owned about 7 per cent of Morocco's productive land, but this land was exceptionally fertile and accounted for 40 per cent of the national income from agriculture.[24] In comparison, the extent of agricultural development in Spanish Morocco seems negligible.

If rural colonization was negligible in Spanish Morocco, the military occupation was not. Since its inception, the Spanish protectorate functioned as a military training ground. During most of the period of effective Spanish occupation, at least 200,000 troops were stationed in the northern zone. This force included the *mehalla,* or Khalifian army, of about 10,000 native troops, and large concentrations of the Spanish army. The more accessible rural areas were patrolled by the *makhzaniya,* or rural police, a force patterned after the Spanish *guardia civil.* Rifians, especially the Aith Wariyaghar, were eager to serve in one of the [701] military forces, and the Spanish, who valued their obedience and hardiness, were just as eager to enlist them. Rifian troops formed a substantial part of Franco's [177] forces during the Spanish Civil War. Military service under Spanish officers or "instructors" led to acceptance of some aspects of Iberian culture. The most strik- [191] ing evidence of such acceptance is the widespread use of Spanish as a second language in the Rif.

Contact between Spaniards and the rural population took place also at the scattered outposts of the Delegación de Asuntos Indígenas. At the head of each outpost was an army officer called an *interventor.* His function was to act as overseer of tribal government. Most *intervenciones* had a school, with a Spanish teacher, and a few had doctors and veterinarians. The Spaniards led a rather sedentary life, and did not attempt to intervene in the routine events of tribal life. But they could impose fines or make arrests if necessary, and the tribal authorities were obliged to implement Spanish directives if they wished to remain in power.

In Morocco, as in most colonial areas, the extent of road building and improvement in communications is a reliable measure of European influence. In Spanish Morocco the first roads were constructed to facilitate pacification and administration. Once this network was established, little effort was made to add tributary lines for more efficient movement of goods. In 1956 Spanish Morocco had about 1,000 kilometers of primary roads, but only half of this distance was surfaced. The track from Bab Taza to Alhucemas was the only durable link between the western and the eastern sector of the zone, and it was blocked for days or even

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[22] M. M. Knight, *Morocco as a French Economic Venture: A Study of Open Door Imperialism* (New York: Appleton, 1937).

[23] Comité d'Action Marocaine, *Plan de réformes marocaines* (Paris: privately published, 1934).

[24] On European holdings in French Morocco, see Planche 33 *b,* "Exploitations rurales européennes," *Atlas du Maroc* (Rabat; Comité de Géographie du Maroc, 1958), and the "Notice explicative" that accompanies the map.

000 weeks by snow. In the final year of Spanish occupation, snow-clearing equipment was limited to a single jeep with a crude wooden plow.

In 1955 the road network consisted of a main east-west route and a number of short tributary routes. During the dry season even the poorer tracks were used by market buses and trucks. Many of the tributary routes were constructed for logging, and a few were built for the collection of cork and walnuts. An intrepid driver could reach many highland valleys. It was even possible to drive from Targist over the Sanhajan mountains to French Morocco. However, many of the logging roads were used for only a few years, and in time abandoned tracks were plowed and converted to barley or wheat. Perhaps the most interesting gap in the Spanish road system was the lack of a through route along the Mediterranean coast.[illegible] The coastal zone between Wad Lao and Puerto Capaz was and is one of the least accessible sections of the Mediterranean littoral.

Spanish efforts to improve port facilities were at best halfhearted. Larache is protected by a 475-meter breakwater, but the entrance to the harbor requires constant dredging, and this effort often lagged behind the accumulation of sand. The mouth of Río Martín might have served as a port for Tetuán, but the Spanish were unable to stabilize the channel. The port of Alhucemas offers sheltered anchorage for ships of ten meters' draught, but is isolated from any productive hinterland by the barrier of the Rif chain. Sebkha Bu Areg (Mar Chica), a lagoon of 115 square kilometers, might have served as a harbor for the eastern plains, but no effort was made to dredge channels or to stabilize the entrance through the bar. At present the port of Nador can be used only by ships of less than three meters' draught. It is indicative of the poverty of Spanish enterprise that Peñón de Vélez, one of the few sheltered coves on the Rifian coast, was never linked to any road.[illegible]

Iron, lead, and copper probably were mined in northern Morocco in Roman time. The Spaniards were interested in the antimony and copper deposits near Ceuta as early as the fourteenth century. During the protectorate at least a hundred deposits were registered, but actual exploitation was limited to the few deposits shown on the map (fig. 14). Numerous mining permits were issued, but many of these were granted to small operators with modest equipment and meager funds.[illegible] The cement works at Tetuán and the iron mines near Melilla were the only operations that employed a large number of Moroccans. The Compañía Española de Minas del Rif mined rich deposits of hematite and magnetite, which were carried to Melilla by a narrow-gauge railroad, but this was the only operation of relatively large scale. Many of the mines were worked only intermittently, and few employed more than a handful of miners. The meagerness of extractive industry is surprising, for interest in mineral resources was one of the motivations of the Spanish occupation.

Spanish industrial activity also was on a small scale. Tetuán had cement works,

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[illegible] Besides the daily service between Ceuta and Algeciras and between Melilla and Málaga, the Compañía Transmediterranea operated a small steamer that made weekly voyages from Ceuta to Melilla, with landings at Puerto Capaz and Alhucemas.

[113] [illegible] On the ports of northern Morocco, see J. Ochoa y Benjumea, "Los puertos de Marruecos," *Anales de la Asociación Española para el Progreso de las Ciencias*, 10 (1945); and H. Surleau, "L'économie des ports marocaines," *Bull. Economique et Social du Maroc*, 75 (1957), 289–304.

[113] [illegible] J. Agard, "Les gîtes minéraux et l'industrie minière de la zone nord du Maroc," *Notes Marocaines*, 9–10 (1957), 13–22.

000 and a number of small factories made soap, shoes, dyes, furniture, matches, paper, and glass. A paper mill, using alfa grass from the eastern Rif, was established at Tetuán. Sawmills, using cedar, fir, and oak, were maintained at Tetuán and Targist, and at several places in the central highlands. Larache had fruit-packing and fish-canning plants. But none of these activities made a substantial contribution to Spanish or Moroccan economy.[illegible]

One is again struck by the contrast between the Spanish and the French zone. In the French zone Europeans traveled into all parts of the country to seek out resources. By the last year of the protectorate there were ostrich farms, mule-breeding centers, nurseries for fruit trees, agricultural experiment stations, large areas of mechanized farming, hydroelectric plants, and numerous mines. The larger cities had light industrial establishments, including printing plants, breweries, and smaller factories producing soap, bricks, and glassware. In 1955 Europeans controlled about 80 per cent of the managerial and directive positions.[illegible] Moreover, Europeans were not restricted to business, civil service, professions, and minor service functions. A large number of Europeans, particularly in Casablanca, were skilled and semiskilled laborers, and many of the latter were Spaniards, Italians, and Maltese. Indeed, French Morocco differed from the Spanish zone not only in its higher degree of economic development but also in the presence of large numbers of relatively poor and unskilled Europeans. 3

It would be idle to speculate on whether the meager development of Spanish Morocco reflects reluctance to interfere in native affairs (as Spanish authors claim), incompetence (as some French authors claim), or shortage of capital. Doubtless all three factors were present. For the detached observer, the interesting question is why Spain so ardently desired this zone. Spanish Morocco was clearly a deficit investment. From first to last, the Spanish zone had little value except as a contribution to national prestige. Spanish pride had suffered from the great defeats in the New World. It was imperative for national honor, if for no other reason, that Spain's remaining possessions be retained and strengthened. The sentimental value of the protectorate is impressed upon any reader of literature on "Spanish Africa." It is significant that the Spanish colonial office published a substantial atlas on the eve of Moroccan independence.[illegible] In sponsoring works of this sort, Spanish officials were expressing that "colonial melancholy" which characterizes the spirit of western Europe as a whole.

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113 [illegible] On industry in the northern zone, see T. García Figueras and R. de Roda Jiménez, *Economía social de Marruecos* (Madrid: Instituto de Estudios Africanos, 1950–1955), III, 223–253.

[illegible] Nevill Barbour, ed., *A Survey of North West Africa (the Maghrib)* (London and New York: Oxford University Press, 1959), pp. 126–130.

[illegible] *Atlas histórico y geográfico de Africa española,* cited in note 9.

CHAPTER V

SETTLEMENT MORPHOLOGY

000 NORTHERN MOROCCO is primarily a rural country. In the 1950 census of the Spanish protectorate, 2,954 places are listed as nuclei of settlement, but more than half of them had less than 200 inhabitants.[1] In 1953 the total population of the protectorate was estimated to be 1,026,056 persons, of whom 788,810 were rural. In the whole of Morocco, rural tribesmen probably account for more than 75 per cent of the population.

Since population density can be calculated only for tribal territories, detailed analysis of distribution is difficult. Nevertheless, it is clear that some areas are much more densely settled than others. The greatest rural density is found on the Atlantic and Rifian littorals, and the lowest in the central highlands and on the semiarid eastern plains. On the terraces and hills of the Atlantic littoral the density of population varies from 50 to 80 persons per square kilometer. In the territory of the Bani Huzmar, which is dominated by karstic mountains, the density drops to 40 persons per square kilometer. Actually, most of this tribe is settled along the base of the limestone range, close to the line of springs. In the Sanhajan highlands the fertile valley of Taghzut, with 85 persons per square kilometer, contrasts with the higher and more rocky terrain of Aith Khannus, with only 22 persons per square kilometer. On the parched plains of Garet, population density drops to about 12 persons per square kilometer. It is surprising to find high density in Gal'aya and the core area of the Rif, for these areas suffer from frequent droughts. Aith Wariyaghar has 65 and Thimsaman 72 persons per square kilometer. The Gal'ayan tribe of Imazujen, with 125 persons per square kilometer, has the highest population density in northern Morocco.[2] Before the recent rebellion these densely settled areas supplied as many as 30,000 laborers annually for the French farms in Algeria. The causes and consequences of emigration will be considered in chapter vi.

The high density of population in Bdor, Amar, and Mzura is encouraged by the small areas of these tribes. Land is available in neighboring territories, but no family wants to sell its land to "foreigners." Tribesmen from the more crowded areas often remark on the underdeveloped appearance of the Jbalan and Ghmaran hills. Tribesmen of the Rif and Gal'aya would gladly work many slopes which the Jbalans and the Ghmarans regard as marginal. [311]

URBAN FORMS AND FUNCTIONS

When the French began their occupation in 1912, Marshal Lyautey declared that European settlements should be set apart from native centers. French settlements grew beside most native cities, but the two forms of urbanization did not merge. The Spanish were less respectful of Moroccan culture, but the urban pattern in the Spanish zone was one of juxtaposition rather than mingling, and the line between European and native communities was never erased. Native cities

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113 [1] *Anuario estadístico, 1952–53* (Madrid: Instituto Nacional de Estadística, 1955), p. 39.

[2] Figures from J. Cabello Alcaraz, *Apuntes de geografía de Marruecos* (Tetuán: Editora Marroquí, 1951), pp. 119–131.

000 now have electricity and plumbing, but functional organization and morphology remain very much as they were before the European occupation.[3]

The narrow alleys, noisy bazaars, and dark corners of the Muslim cities contrast sharply with the bright and spacious arrangement of the European settlements (pl. 7, *a*). The former are always surrounded by walls, and other walls divide the urban area into wards. There is usually a large open space near one of the principal gates, serving as a market place. Here country people come to expose their wares and to exchange farm surplus for articles offered by merchants from the city. The more sophisticated cities occupied by descendants of Andalusian refugees (e.g., Tetuán, Wezzan, Fez) are divided into economic quarters, but most cities maintain an ethnic or tribal division, and each ward has its own crafts and trades.

Producers or retailers of the same kinds of goods usually occupy adjacent stalls, and each trade is likely to have a lane to itself. Carpenters, leather merchants and the makers of slippers, smiths and the producers of copper utensils, all have their special lanes. On the periphery of the built-up area are the industries that require space and involve activities regarded as undesirable: butchers, dyers, tanners. Candlemakers, dealers in incense, and booksellers usually settle near the largest mosque.

Each city has a few cobbled streets that lead across town from one gate to another. Branching out from the main streets are narrow lanes that end in blind alleys. Business districts may take the form of a single band (e.g., Meknès), a double band enclosing a narrow residential district (e.g., Fez), or may virtually surround the city (e.g., Rabat). A line of shops may extend for some distance along the main street. Occasionally, the space between opposing roofs is covered, and when the road has been sprinkled with water the atmosphere is surprisingly cool and damp. It is difficult to generalize about population densities, but they must be high. Houses and shops often have common walls, and private structures are usually small. Many craftsmen work in minute booths.

Tetuán and Shawen exhibit features characteristic of most Moroccan cities.[4] The *madina*, or native quarter, of Tetuán forms an irregular triangle, and is divided into six wards, each with its own mosque. Access to the city may be gained by any one of six gates. The streets of Tetuán, like those of all Moroccan cities, are intricate and confusing.

At the turn of the century Joly divided the native industries of Tetuán into eleven categories, including leatherwork, ceramics, metalwork, woodwork, building, painting, textiles, clothing, and numerous small trades and industries, ranging from bookbinding to the manufacture of gunpowder.[5] The most important guilds were and still are the tanners, shoemakers, and potters.

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[113] [3] The classic study of urbanism in Morocco is Roger le Tourneau, *Fès avant le protectorat: étude économique et sociale d'une ville de l'Occident musulman* (Casablanca: Société Marocaine de Librairie et d'Edition, 1949). For a summary account of urban geography, see Konrad Wiche, "Marokkanische Stadttypen," in *Festschrift zur Hundertjahrfeier der geographischen Gesellschaft in Wien, 1856–1956* (Vienna, 1957), pp. 485–527

[4] Tetuán is derived from the Berber "Thittawin" meaning "eyes." Shawen is the local Arabic of the Berber "Ishshawen" meaning "horns," and refers to the peaks that tower above the town. In 1953 there were 47,000 Muslims in Tetuán, and 11,500 in Shawen. Tetuán also had 30,000 Spaniards and 4,000 Jews. Shawen had 2,500 Spaniards but only 15 Jews. *Anuario estadístico, 1952–53*, p. 42.

[013] [5] A. Joly, "L'industrie à Tétouan," *Archives Marocaines*, 8, 11, 18 (1906–1912).

000 Physical form differs little from the largest to the smallest city. Shawen has a bewildering number of narrow alleys and dead ends—the same pattern of walls and gates found in Tetuán, Fez, and Marrakech, the same crowded houses and minute booths. The one distinctive feature of Shawen is its architecture. Sloping tile roofs and whitewashed walls betray Andalusian influence.

Shawen has a number of craft guilds and three tanneries, but their products are largely for local use. The presence of a ward of shoemakers suggests that the making of leather slippers was once an important industry. Today the Shawen shoemakers send their work to Tetuán for finishing. Silk and linen work used to be important, but neither is now practiced. The most important industry at present is textile weaving, which is unsurpassed in Morocco. Shawen is said to produce the finest cloaks in the northern zone.

In Morocco, as in most parts of the Muslim world, it is difficult to find intermediate stages in the settlement hierarchy. Indeed, there is no equivalent in Maghribi Arabic for the word "town." From *madina* (city) the Moroccan vocabulary turns to *dshar* (village), *douar* (hamlet), and *azib* (farmstead).

One reason for the absence of intermediate forms of urbanization is that the existing cities did not evolve as trading centers for the rural countryside. In rural Morocco the traditional foci of commerce are weekly markets (*aswaq*) held in the open air. Permanent markets are a recent development, and most of them are located in areas where European influence has been strong. In the more isolated and self-sufficient districts the successful functioning of the weekly markets has acted as a check against urbanization.[*]

The Moroccan city is an imposed entity, foreign to tribal life. Some cities trace their origin to Roman time, others began during the period of Arab conquest, and still others were founded by Europeans. No Moroccan city is truly native. It is not surprising, therefore, that cities should be found only in the lowlands where alien authority was easy to establish and maintain. In the highlands, Berber ideals of political independence and economic self-sufficiency had an arresting effect on urbanization.

The ports of Ceuta and Melilla were used by the Portuguese and Spanish as bases of colonial and military activity, and even today are governed as integral parts of Spain. Larache and Arcila also reflect Iberian influence. Tetuán began as a military post designed to protect the route from Tangier to Fez. In the sixteenth century it was a focus of immigration for Muslims and Jews who were being expelled from Spain. Shawen, established in 1471 as a base of operations for campaigns against the Portuguese, served also as a refuge for Andalusian Moors. Ksar al-Kebir had a similar function in the eleventh century. Tangier has been the headquarters of a whole series of foreign interests: Carthaginian, Roman, Portuguese, Spanish, English, and lately even international. Most of the Moroccan residents of Tangier are immigrants from the Rif, who do not wish to be identified with the Jbalan tribesmen of the nearby hills. Only two other settlements in the northern zone, Alhucemas and Nador, deserve to be called towns, and they owe their development to the Spanish.

Intimate relations between city and hinterland are difficult to establish when

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(113) [*] For a fuller discussion of this topic, see M. W. Mikesell, "The Role of Tribal Markets in Morocco," *Geog. Rev.*, 48 (1958), 494–511.

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

R 4 5 361 341 102

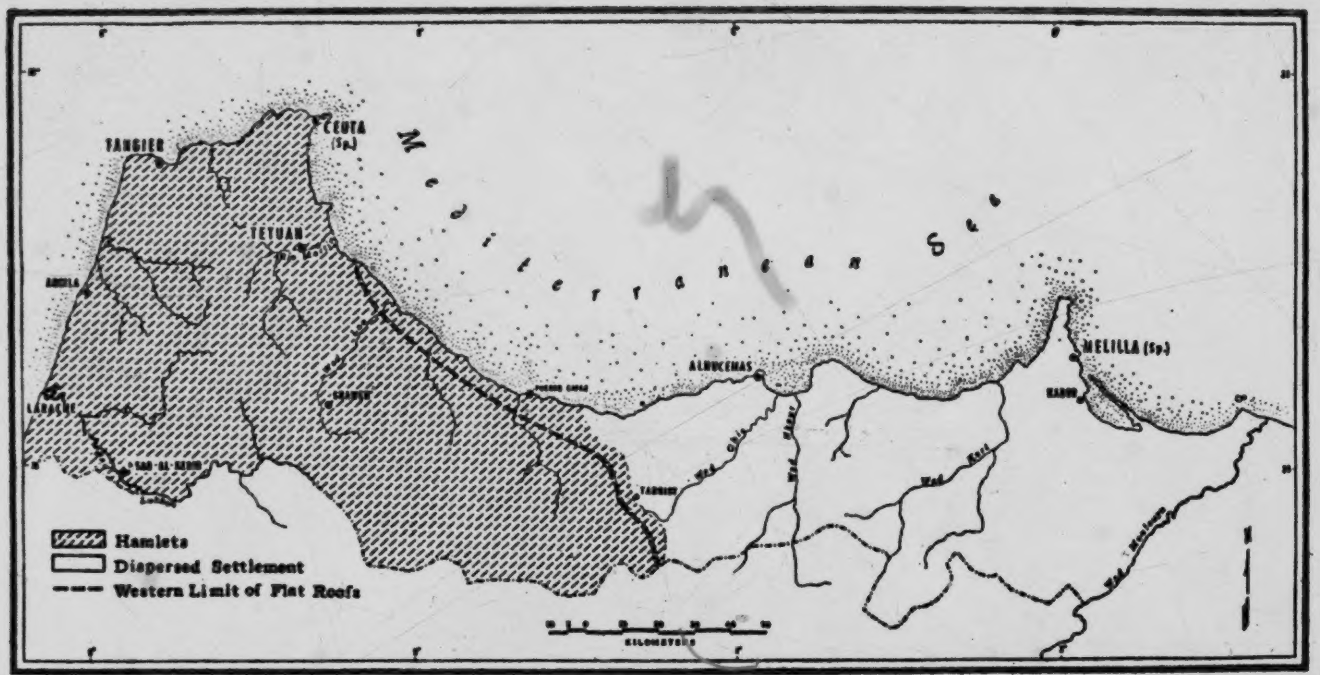
TANGIER
CEUTA (Sp.)
Mediterranean Sea
TETUAN
ARZILA
LARACHE
CHAUEN
KSAR-EL-KEBIR
ALHUCEMAS
TARGUIST
MELILLA (Sp.)
NADOR
Wad Ghis
Wad Nekor
Wad Kert
Wad Moulouya
▨ Hamlets
☐ Dispersed Settlement
Western Limit of Flat Roofs
KILOMETERS

Fig. 15. Northern Morocco: settlement morphology.

/p. 68/

000 urban institutions are imposed by alien authorities. Such cities become parasites, drawing support from the rural countryside but offering little in exchange. The peasant population continues to look to its local markets for satisfaction of basic needs.

Hamlets versus Scattered Houses

Since they are walled, Moroccan cities begin and end abruptly. Pass through a gate and you are in the rural countryside. The type of landscape varies notably between the eastern and western parts of this zone. The basic distinction is between clustered settlements in the western areas and widely scattered houses in the Rif (fig. 15).

R J S 361 171

Clusters of ten to fifty houses make up the basic settlement pattern in Jbala, Ghmara, Sanhaja as-Srair, and along the Atlantic littoral. In these areas the presence of an isolated house indicates that its owner has more than one place of residence; his first and most frequented home is generally with a cluster of several others. Isolated houses are usually of recent construction, and probably reflect the increased security introduced by the Spanish occupation. When it was no longer necessary to live close to trusted kinsmen, the more independent tribesmen settled on good land away from the ancestral hamlet.

S [342]

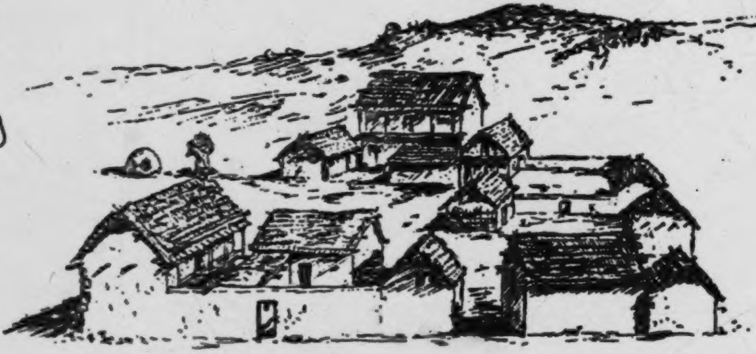

Fig. 16. Hamlet in Aith Seddath.

R J S 621 596 171 [421]

The inhabitants of a hamlet are members of an extended family, formed of parents or grandparents, and the children of their sons. This unit does not break up unless the sons quarrel or the kin group becomes too large to be supported by the available land. Thus the basic unit of kinship, the biological family, is also the basic unit of settlement. Moroccans are averse to dividing up their land. When brothers inherit their father's land, they usually farm it jointly, and the eldest brother administers the property for all.

R J S 361 342 171

The growth of a hamlet follows the growth of a family. A newly married couple builds a new house, as close as possible to the husband's hamlet. Their first unit is a single hut, with a sunken area for domestic animals. As the livestock multiplies, another hut is erected to serve as a barn. When the sons of the pioneer couple marry, other huts are built adjoining the parent's home. The basic unit is extended into an L- or U- shape, and similar units are added by the grandchildren (fig. 16).

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

R
4
5
361
342
171
102
341

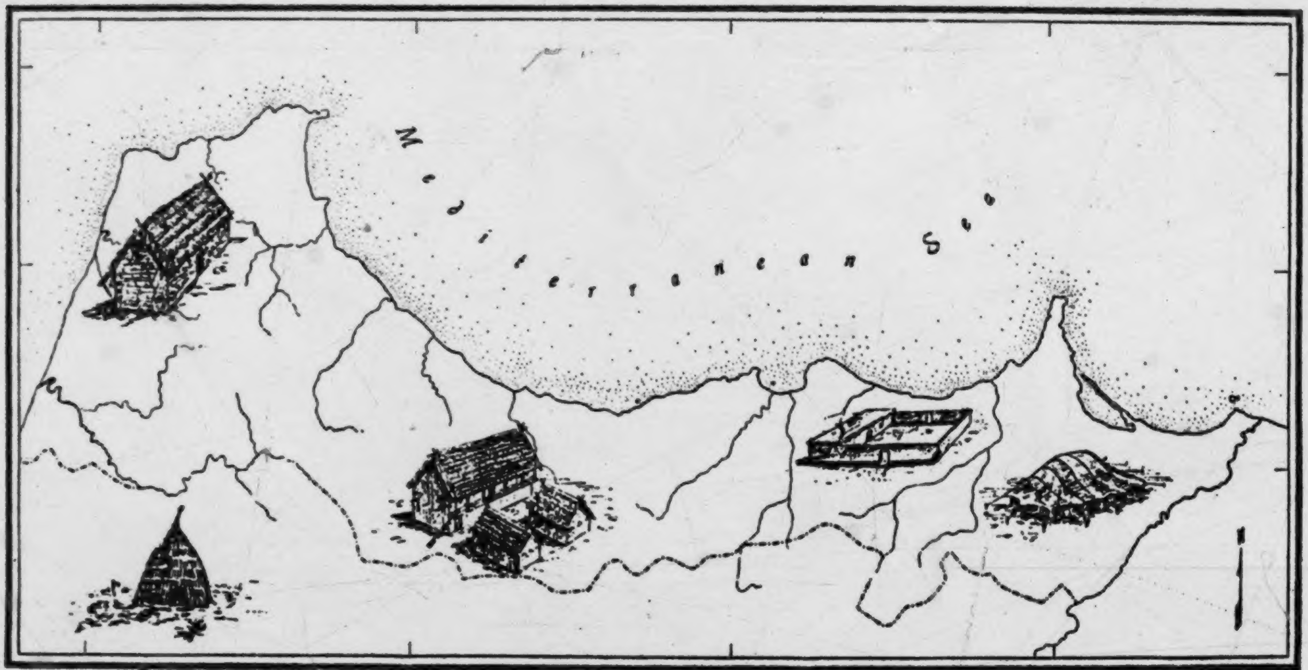
Mediterranean Sea

Fig. 17. Northern Morocco: principal types of houses.

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R S 342 341 171

is extended into an L- or U-shape, and similar units are added by the grandchildren (fig. 16). In Ghmara and Sanhaja as-Srair, growing families are often accommodated by the addition of a second story, but this type of architecture is rare in the deforested areas of Jbala and the Rif.

R J S 361 [312]

The necessary conditions of settlement are adequate amounts of land and a reliable source of water. Water is the more critical requirement. There must be sufficient water for drinking, watering the animals, washing clothes, taking an occasional bath, and, if possible, operating a grist mill. The runoff of the stream should be sufficient to irrigate a few precious plots of terraced land in which to grow vegetables and protein-rich legumes. In Jbala most hamlets appear on ridges overlooking the cultivated land. In Sanhaja as-Srair the preferred settlement sites are near the bottoms of valleys, close to perennial streams. Settlement forms a continuous line where terraces can be constructed along a large stream. The valley of Abd al-Ghaya in Ktama is a narrow ribbon of terraces and houses, stretching ten kilometers. In the valley of Taghzut the ribbon form of settlement is even more striking.[7] The concentration of settlement in deep valleys imposes severe barriers to communication. In Bani Hmid and Bani Bu Shibat, neighboring hamlets are often separated by ridges towering several hundred meters above the inhabited land. Similar problems are created by the deep ravines on the Ghmaran coast. To visit a friend or reach the nearest market, many tribesmen must spend hours on tortuous trails. In the steepest valleys, settlements are themselves terraced, like the cultivated land.

R 361

In most of the Rif the terms "hamlet" and "village" are complete misnomers. Reflecting the independent spirit of their owners, Rifian houses are separated by at least a hundred meters; in Aith Wariyaghar the usual spacing is three hundred meters,[8] and in former generations each house had a corner tower used as a lookout and blockhouse. The houses that make up a lineage unit are usually closer to one another than they are to those of any other unit, but a man must walk a short distance to visit his brother. S J [361] In Sanhaja as-Srair, however, he would have only a few steps to walk. In Jbala and Ghmara the houses of kinsmen often have common walls. R 361 923 619 171 In most of Morocco, and especially in the Rif, houses are located in territory that indisputably belongs to one tribe or another. Border zones are seldom used except as range land, and in former generations even this use led to violent conflicts.

TYPES OF HOUSES

R 342 171

In the whole of Morocco there are at least seven distinct types of houses. In the Gharb and in most of the coastal zone between Rabat and Wad Lukkus, the common house is a crude conical structure (*nouala*) of cane and thatch. On the southern slopes of the Atlas and in the oases of the pre-Saharan zone, houses are huge multistory structures (*qsar*) made of rammed mud blocks. On the northern slopes of the High Atlas, houses are built of stone, and resemble solid little blocks.

R [113]

[7] See the aerial photographs of Taghzut in Jules Blache, "Modes of Life in the Moroccan Countryside," *Geog. Rev.*, 11 (1921), 501.

R [113]

[8] A. Sánchez Pérez, "Datos historicos sobre ciudades rifeñas," in *Selecciones de conferencias y trabajos realizados durante el curso de interventores, 1951–52* (Tetuán: Imprenta Cremades, 1952), describes this distance as "el radio mínimo del espacio vital que un Rifeño de buena raza necesita para respirar a sus anchas."

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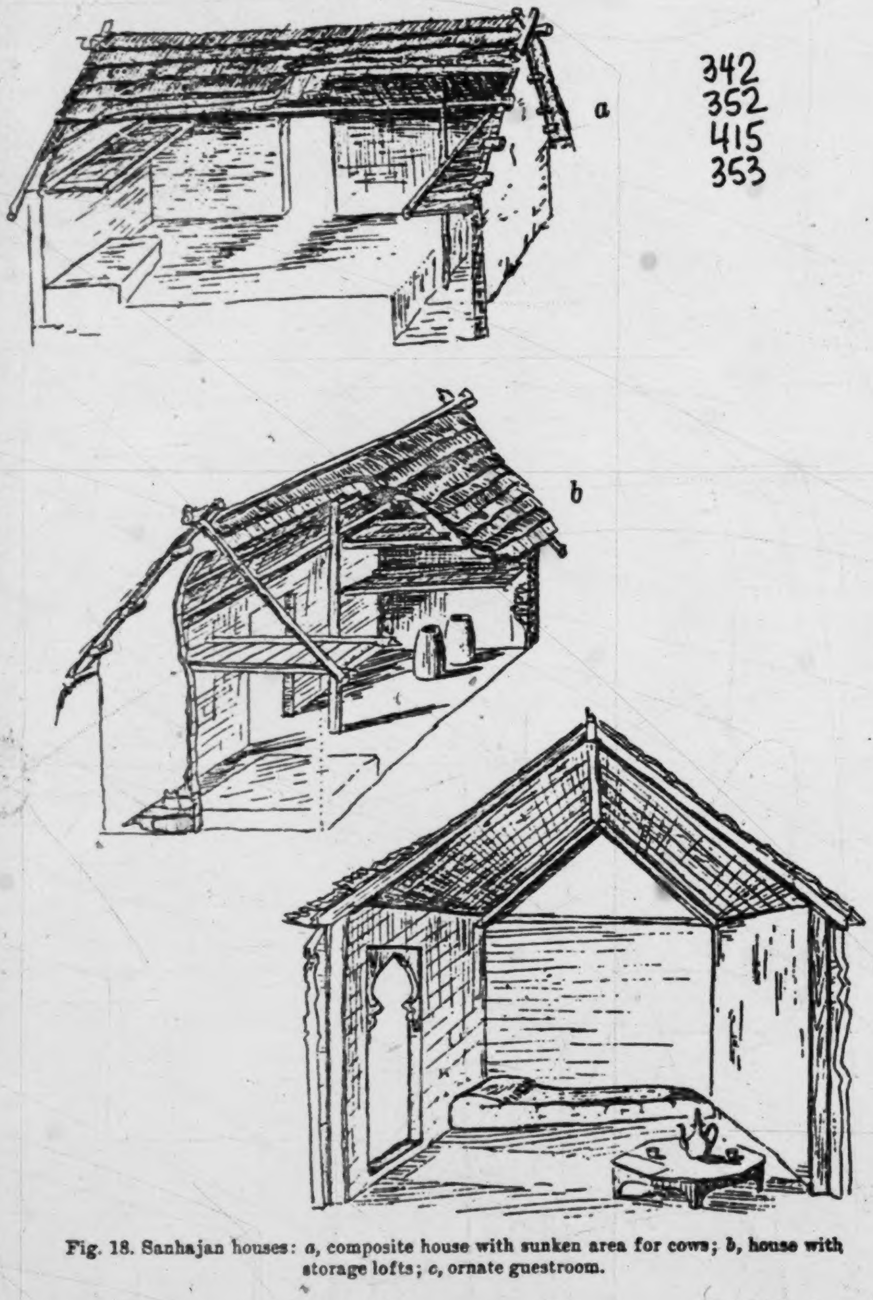

Fig. 18. Sanhajan houses: *a*, composite house with sunken area for cows; *b*, house with storage lofts; *c*, ornate guestroom.

R 342 171 Rectangular houses, built about a courtyard, are common in the Rif and in the coastal zone from Mazagan to Agadir. The tribes of the Middle Atlas, who practice transhumance, spend the summer months in tents. Tents are seen also in the Gharb and in the lower Moulouya Valley. In the northwestern corner of Morocco one finds still another type of house, again rectangular in shape, but with a sloping roof of thatch.*

The sketches in figure 17 illustrate and roughly locate northern Morocco's main architectural styles. Two traditions are immediately discerned. In the eastern half of the zone the houses have flat roofs and the walls enclose an open courtyard; in the western area the houses have sloping roofs and there are no courtyards. Tents of woven goat hair appear only in the areas occupied by pastoral tribes—Ibdharsen, Aith Bu Yihyi, and Ulad Stut. R 342 361 171 The division between flat and sloping roofs coincides almost exactly with the division between clustered and dispersed settlements. These distinct patterns of settlement in turn roughly coincide with the division between Rifian and Arabic or Sanhajan speech (cf. figs. 15 and 12). Targist, with clustered settlement and houses of both eastern and western style, is an area of transition. Settlement morphology reveals the heterogeneous character of this tribe.

J 342 171 Houses are built of mud brick in Jbala and along most of the Atlantic littoral. After the walls have been constructed, a ridgepole, usually the trunk of a slender riparian tree, is placed across the top of the structure, and smaller poles are set at right angles to the ridge. Thatching is applied, and the house is ready to be occupied. The distinguishing feature of houses in the Jbalan area is that the thatch is allowed to droop almost to the ground. Hipped roofs are seen in Anjra and the Fahs territory, but the more common form is a simple saddle or ridge. The Jbalan house is a small structure about five meters long and three meters wide. There is seldom any differentiation of floor levels or rooms, and furnishing is usually limited to a single mat or rug. Hamlets may be enclosed by a cluster of opuntia or a brush fence, but there is no attempt to build houses and walls to enclose a courtyard.

000 South of Wad Lukkus, in the Gharb, the Jbalan type of house is replaced by cruder structures of cane or reeds. One form is like the Jbalan house, except that its walls are made of wickerwork. Another and much cruder form consists of a conical or circular framework of cane covered with straw. This structure, which seems to be of Sudanese origin, has been adopted by settled tribes of bedawin origin as a substitute for tents. Conical huts are the dominant dwelling in the

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R (113) * In the area of French influence, the literature on rural architecture is abundant, but for the Spanish zone there are only the accounts of E. Blanco Izaga, *La vivienda rifeña* (Ceuta: Imprenta Imperio, 1930); C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931); and Ernst Rackow, *Beiträge zur Kenntnis der materiellen Kultur Nordwest-Marokkos: Wohnraum, Hausrat, Kostüm* (Wiesbaden: Otto Harrassowitz, 1958. On types of houses in French Morocco, see A. Bernard, "L'Afrique du Nord," in *L'Habitation indigène dans les possessions françaises* (Paris: Editions Maritimes et Coloniales, 1930); Robert Montagne, *Villages et kasbas berbères* (Paris: Felix Alcan, 1930); E. Laoust, "L'habitation chez les transhumants du Maroc central," *Hespéris*, 10, 14, 18 (1931–1944); M. Gaud and G. Sigault, "L'habitat indigène au Maroc," *Bull. de l'Institut d'Hygiène au Maroc*, 4 (1937), 4–102; André Adam, *La Maison et le village dans quelques tribus de l'Anti-Atlas* (Paris: Larose, 1952); Dj. Jacques-Meunié, *Greniers-citadelles au Maroc* (Paris: Larose, 1951); E. Mauret, H. Pommeret, and R. Ringuelet, "Problèmes de l'habitat rural dans la région de Rabat," *Bull. Economique et Social du Maroc*, 70 (1955), 15–71; and R. Aujard, "Problèmes de l'habitat rural dans la région d'Agadir," *ibid.*, 75 (1957), 275–288.

000 coastal plains between Rabat and Ksar al-Kebir, but they have not yet penetrated
the northern zone.

R Ghmaran houses differ slightly from those farther to the west. Like the Jbalan
342 houses they are rectangular and have thatch roofs. Ghmaran houses may, how-
[171] ever, have two stories. Another distinguishing feature is that adjoining structures
S often have common roofs. Ghmaran hamlets, like those in Sanhaja as-Srair, tend
R to develop into units of L- or U-shape (pl. 2, *a*). When a second story is added,
[417] steps are cut into the adobe walls. (In Sanhaja as-Srair the second floor is reached
by a notched log.)

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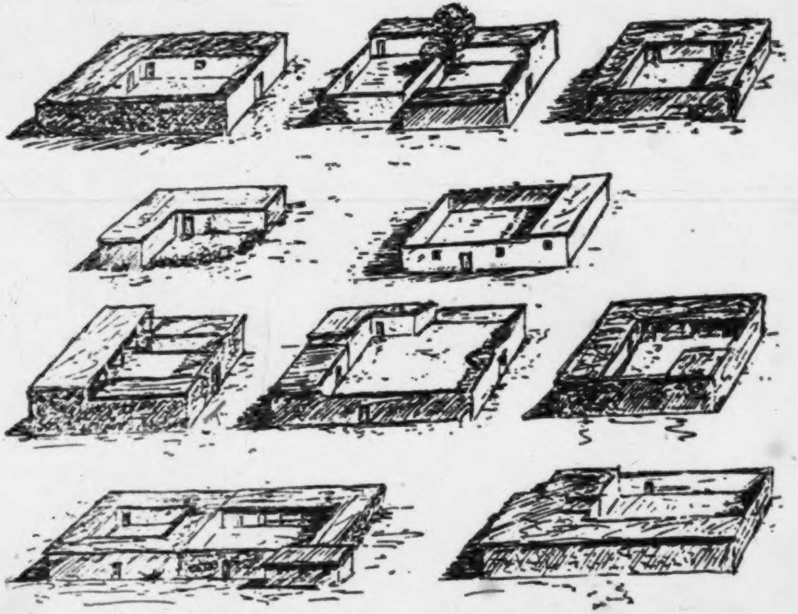

Fig. 19. Examples of Rifian courtyards, Aith Wariyaghar.

000 by a notched log.) Ghmara seems to be the only area in northern Morocco with
R special structures built to serve as granaries. Communal granaries (*agadir*) usu-
343 ally have the form of the prevalent houses.[10] Individual or family granaries are
small structures of adobe brick and plaster set on wooden planks and supported
by stone pedestals.[11]

S At first glance, Sanhajan houses seem much like those in Ghmara and Jbala.
342 The difference is in detail rather than in general outline. The foundation of the
[171] Sanhajan house is a rectangular shell of mud brick or stone with end sections
constructed to form peaks about two meters above the walls. The two ends of

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[113] [10] In northern Morocco communal granaries are found only in the territory of the Bani Zejal. Robert Montagne, *Un Magasin collectif de l'Anti-Atlas: l'Agadir des Ikounka* (Paris: Larose, 1930), p. 64 and figs. 24, 25.

[11] J. Caro Baroja, *Estudios Mogrebies* (Madrid: Instituto de Estudios Africanos, 1957), p. 133.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Senhaja MX4

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342 the shell are joined by a ridgepole, most often a young cedar or a riparian tree. Two or more other poles are added to a form a solid framework for the roof (fig. S [824] [532] 18, *a* and *b*). Rye straw is the preferred material for thatch, and it is placed with great care (pl. 3, *a*).^A^ The ridgepole is set between two timbers, the ends of which are carved in the shape of a crescent moon. The crescent ornament is sometimes

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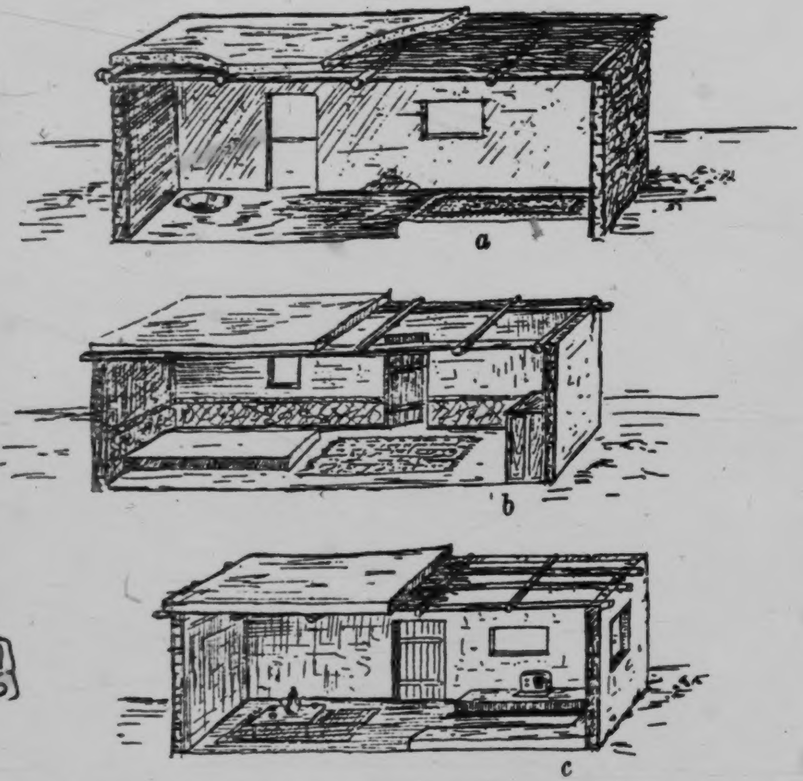

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Fig. 20. Rifian houses: *a*, simple house with sleeping platform and fire pit; *b*, house of a moderately prosperous tribesman with wallpaper, cabinet, and mat; *c*, house of a tribal authority with padded benches, portable radio, mat, and table for tea service.

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342 [532] [335] crowned with a carved model of a charcoal brazier and a teapot, thus uniting the symbols of hospitality and good luck (pl. 3, *a*). When stone is used, walls are usually covered with a thin layer of plaster. Wooden cribwork may be used to strengthen walls.

There are more two-story houses in Sanhaja as-Srair than in any other area of the northern zone. This preference for more elaborate structures reflects the more abundant supply of timber. When a two-story house is built, joists are cut

A, [See p. 127--Analyst]
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7: Mikesell   K-4,5   (1955-1957)   1961   MX3 Rif MX3
Senhaja MX4

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342 a meter or so longer than the width of the space between the opposing walls.
S The projecting rafters are covered with planks, and other poles connect them
[417] with the overhanging roof. The result is a durable platform at the level of the
[513] second floor, which is used for drying hay and hemp, and for sleeping in summer
[352] (pl. 3, *b*).^A A gentleman of leisure likes to have two platforms, one for the southern
exposure and another for the setting sun.

S The harsh winters in the Sanhajan highlands necessitate elaborate provisions
[353] for the storage of hay, fuel, and food. Each house has at least one loft, formed
of poles set in the opposite walls and covered with planks (fig. 18, *a* and *b*). A
separate hut may be built for sheep and goats, but the family cow is often kept
S in a sunken area at one end of the house (fig. 18, *a*). In the larger hamlets, separate
[574] structures or rooms are built for sleeping and entertaining guests. Guest
rooms are usually on the second floor, and are always more elaborate than the
S rest of the house. In Abd al-Ghaya and Taghzut, where carpenters are highly
[335] skilled, such rooms have the Moorish arch at the doorway and are roofed with
[341] carefully fitted planks (fig. 18, *c*). Since cooking is usually done on a charcoal
[252] brazier, no special provision is needed for a hearth, a chimney, or smoke holes.
[354] Except for the door, which is rarely closed, light enters only from one or two
[352] small windows. Mats, blankets, and an occasional table are the only furnishings.
Moroccans are not averse to sitting or sleeping on hard floors.

R Rifian houses, whether of adobe or masonry, have flat roofs (pl. 2, *b*),^B and the
342 walls and rooms are constructed about an open courtyard. Rooms may occupy
[351] one or all sides of the enclosure, and two or more squares may be joined (fig. 19).
Rafters are cut longer than the width of the room so that the overhang can be
R used as a porch or drying platform. Since the winters are mild in the Rif, the
[351] open courtyards serve as enclosures for domestic animals. Rifian houses are some-
[231] what longer and narrower than those in Ghmara and Sanhaja as-Srair, a reflec-
[171] tion of the shortage of timber. In the highlands, stone is used for walls, whereas
[333] sun-dried bricks are used in the alluvial plains. In Aith Wariyaghar most houses
are whitewashed.

R Aside from the flat roofs and narrow rooms, Rifian houses do not differ from
[171] those in Ghmara and Sanhaja as-Srair. Floors again consist of bare earth or a
[352] thin layer of clay. A raised platform, covered with a mat of alfa or palmetto fiber,
R serves as a place of repose. The three houses shown in figure 20 show the usual
342 progression from a modest to a higher standard of living. The man of means has
556 a whitewashed room, a substantial door, and perhaps a strip of wallpaper. The
best houses have padded benches rather than simple platforms. Add a table for
tea service, a radio, and glass windows, and you have an ideal model of the home
of a shaikh or qadi. Remove these items, and you have an average Rifian home.
In most of Morocco, wealth is reckoned in land, not in material embellishments.

R An interesting aspect of rural architecture in northern Morocco is the lack of dis-
341 tinction between humble dwellings and official or ceremonial structures. Mosques
346 in most of the northern zone are merely larger versions of the prevalent types
171 of houses. The same comment can be made about the shrines of saints, except that
the structure is usually smaller than the average house. Minarets are a recent
innovation, and many of them were built by Spanish *renegados*. The only minaret

A, [See p. 127--Analyst]   B, [See p. 126--Analyst]

341 in the central highlands is that at the zawia of Tifah in Targist; the nearest
346 minarets are in the territories of Aith Tuzin and L-Khmas, 60 and 75 kilometers
171 away. Whitewashed domes or ornate corners decorate the shrines of some saints
(pl. 9, *a*), but for every saint honored by such structures there are at least fifty
others with shrines that are not fundamentally different from the common types
of houses. Even granaries and grist mills are built in the one local style (fig. 22).

CHAPTER VI

LIVELIHOOD

000 THE RURAL POPULATION of northern Morocco is composed mainly of sedentary farmers who enjoy some of the advantages of specialization and exchange. They are not peasants in the European sense of the word, but neither are they subsistence farmers comparable to some of the tropical African tribes. Differences in slope and exposure encourage a modest degree of crop specialization even among communities that strive to be self-sufficient in staple foods. The purpose of specialization is to produce crops that can be exchanged for others less well
S adapted to the available land. In the Sanhajan highlands there is a notable dif-
241 ference in land use on sunny and shady slopes; yet all Sanhajan communities
311 try to produce an adequate amount of barley. Tea, sugar, salt, and kerosene
constitute the only primary commodities that must be brought in from the out-
S side. Since barter is common locally, currency has little value as a medium of
437 exchange, except for a few hours on market days, for example, after the sale
436 of eggs or walnuts but before the purchase of a week's supply of sugar or tea.
000 Morocco's large food imports—more than half of the wheat flour consumed between 1946 and 1950 was imported[1]—are directed to cities and towns.

Another distinctive feature of rural economy is the meager development of craft specialization. The cumulative skills of any rural community do not greatly exceed the combined skills of a man and his wife. If necessary, any man can produce most of the tools he needs; and the combined knowledge of a hundred women does not greatly exceed the knowledge of any one woman of middle age.

Since technology does not vary greatly from place to place or even among individuals, prosperity or poverty is conditioned primarily by the quantity or quality of land. From the standpoint of precipitation alone, the most attractive parts of northern Morocco are the limestone highlands extending from Ceuta to Shawen, and the sandstone outliers on the western margins of the Rif chain. But the precipitation often has very little efficacy. The concentration of most of the annual rainfall during a few days emphasizes its torrential character and erosive power on steep slopes. Most of the calcareous zone is now devoid of soil, and a large part of the arenaceous highlands have been eroded down to sterile subsoil. There are great variations in fertility even in the lowlands. At one end of the scale are the poor dune soils south of Larache. The dark color of many of the heavier soils is indicative not of humus but of iron salts. Between these extremes of sand and clay is a wide range of loams, like the *hamri*, or terra rossa, which are better suited to cultivation and better adapted to irrigation. But the total area of such soils, indeed of all alluvial soils, amounts to less than 10 per cent of the northern zone.[2]

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[1] *Anuario estadístico, 1952-53* (Madrid: Instituto Nacional de Estadística, 1955), p. 95.

[2] On edaphic conditions in the northern zone, see J. A. Jiménez Salas, "Suelos de la zona norte del protectorado de España en Marruecos," *Anales de Edafología y Fisiología Vegetal*, 5 (1946), 277–305; 8 (1949), 3–31.

THE AGRICULTURAL CALENDAR

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Moroccan agriculture is conducted on the basis of the Julian almanac, and the Latin names for the months have passed with but slight changes into Arabic and Berber. In most of northern Morocco the agricultural cycle involves a combination of dry farming, horticulture, and the cultivation of small irrigated plots. Dry farming as practiced in the Mediterranean region is essentially a matter of farming the same land every other year and of tilling it during the fallow period. In this way as much moisture as possible is kept in the ground for the next year. Since few communities can produce enough grain during the alternate seasons to allow for the fallow years, dry farming requires constant clearing of new land.

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In the hilly areas of Jbala and Ghmara the beginning of the agricultural year is marked by fires set to clear new fields, and the haze of smoke lingers until the arrival of the first rains. By the end of the summer drought, animals are weakened by the scarcity of feed; and wherever the soil is clayey the drought-hardened surface is difficult to plow. So the farmer waits for the first rains for plowing and the second for seeding. After the soil has been turned, cereals, usually barley or hard wheat, are broadcast. Then the soil is again worked with the plow and, since Moroccans do not use the harrow, clods are broken with clubs or hoes.

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In the western half of the northern zone, plowing usually begins toward the end of September, and sowing is completed by the beginning of November. In the eastern sector the first heavy rains may not come until March or April. In this event, no further thought is given to barley or wheat, and a desperate effort is made to prepare the soil for a summer crop of sorghum. When cereals are sown, the feverish activity of autumn gives way to a period of virtual hibernation. Only the women keep busy, for there is always need for fodder and fuel.

In frost-free areas, February marks the beginning of the work of planting, pruning, grafting, and fertilizing the fruit and nut trees. This task continues through March and April. In the lower areas of the Rif the most common trees are the fig, pomegranate, almond, and olive. In the highlands walnuts are most important. Trees are cared for assiduously, for dried figs, raisins, and nuts constitute the principal food reserves after the cereals have been consumed. Since they do not have to be watered, figs and vines usually occupy the higher and steeper slopes. New olive trees are usually obtained by grafting on the oleaster. The olives are often left so long in heaps on the ground that they begin to ferment, and the oil is very rancid when the fruit is eventually pressed.

The arduous task of rebuilding terraces, dams, and ditches begins in March. This work is not yet finished when it is time to begin the harvest of the cereals. The shortage of manpower at this time is offset by the women, who reap the grain with sickles and carry it to threshing floors. There it remains until the men have completed the planting of the summer crops. Then all effort is devoted to threshing and winnowing. This work begins in July and in bountiful years it may still be in progress when the first rains fall. Threshing takes place on communal floors, which may or may not be paved. These are always in an exposed position, and when the mixture of grain and straw is thrown in the air, it is separated

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241 by the wind. Cattle, mules, or donkeys tread the crop and separate the grain
171 from the chaff. As the animals are driven in a circle, the men work with win-
221 nowing fo[illegible] (pl. 5, *a*),A After most of the chaff has been removed, the women take over and finish the winnowing by hand. The men then set to work piling up the straw to be used as fodder during the winter months. In Garet and Gal'aya, the usual form of strawstacks is oblong; in the Rif they have a circular form. Strawstacks are sometimes covered with a thin veneer of mud; sometimes they are held in shape by stones tied to ropes. In the wetter, western provinces straw must be stored inside.

In early September, maize is harvested and the almonds and figs are collected. The remaining trees, including the olive, do not bear fruit until November or December. Grape picking, usually in mid-September, marks the end of the agricultural year. After this has been done, the cereals reaped and threshed, and the strawstacks prepared, there is time for rejoicing. September is the usual month for weddings and also for festivals and pilgrimages. But it is already time to think of the new cereal crop, and smoke from fresh clearings marks the beginning of a new year.

The cycle just described is most applicable to Ghmara, Sanhaja as-Srair, and the western margins of the Rif. On the Atlantic littoral there is little danger of frost, and vegetables may be grown at any time of the year. The calendar of events in the drier and warmer parts of the northern zone is usually two or three weeks ahead of the cycle in the highlands. When autumn rains fall over the zone, cereals are ready for harvest in the warmer eastern sector in May, but as often as not the advantage of higher temperatures is offset by meager or tardy precipitation. In 1957 the first heavy rains did not reach Gal'aya until April.

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241 The pattern of land use in the highlands reflects centuries of trial and error.
171 The problem here is that it is virtually impossible to grow more than one crop on the same plot of land. Maize and hemp must be planted before the cereals are ripe, and there is also a conflict of time between the harvest of cereals and the planting of vegetables. Hence a division is made between land planted to summer and to winter crops. Since the former are dry-farmed and the latter irrigated, this division coincides with a break in slope. When there is abundant water for irriga[illegible]n, cereals, figs, and vines are pushed to higher and more precipitous slopes. The Aith Arbi, who own valuable terraced land on the north
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[241] slope of Adrar Tidighin (pl. 6),B arranged a generation ago to purchase additional
[185] land at a lower elevation so that it would no longer be necessary to devote precious
[432] irrigable land to cereals. Similar divisions have been effected by many highland communities. The disadvantages of specialization are offset also by barter at the
S
[245] weekly markets. In Ktama, tribesmen from the deep valley of Abd al-Ghaya grow
[241] an abundance of grapes, figs, oranges, and vegetables, which can be exchanged
[437] for grain produced on higher and drier land.

Most highland communities are not so fortunate, and an attempt is made to allocate land for each season. Cultivation is usually spread over three distinct zones, which are worked at different times of the year. First, and lowest in a valley, is the zone of terraces reserved for the irrigated crops. The next zone, at a slightly higher elevation, is planted to cereals, figs, and vines. A still higher

A,B,[See pp. 129-130--Analyst]

R 241 171 zone may be used only for pasture. This arrangement seems orderly and rational, but its effect is to accelerate the deterioration of the land. Grain stubble (which is often grazed) and vines (which are often placed parallel to the slope) do not constitute an adequate protection for the soil. As population increases, the zones of dry farming and pasture are extended to higher slopes. First the forest is destroyed, then the scrub cover is removed, and eventually the zone of dry farming is stripped of soil.[3]

CROP COMBINATIONS

The basic crops of northern Morocco are well adapted to the Mediterranean climate, for cereals can be grown during the rainy season, and trees, by virtue of their large root systems, are suited to the long dry summers. When water is available for irrigation, diets are balanced and there is no danger of famine. This happy combination of dry farming, horticulture, and gardening is realized only in the highlands and on the main river plains. Irrigated land probably accounts for less than 5 per cent of the surface of the northern zone. Most tribesmen depend on the unpredictable rains.

R [243]

TABLE 4
LAND UNDER CEREALS
(Hectares)

	1936–40	1951	1952	1953
Barley	75,729	193,600	164,129	174,905
Wheat	30,518	70,895	73,180	76,392
Sorghum	25,656	49,092	51,094	46,981
Maize	4,318	4,992	6,020	6,206
Rye	1,253	3,411	3,724	3,305
Totals	137,474	321,991	298,147	307,789

SOURCE: *Anuario estadístico, 1952-53* (Madrid, 1955), p. 93.

R 243 171 In the whole of Morocco about 90 per cent of the land under field crops is planted to cereals. Table 4 shows the amount of land used for growing cereals in the northern zone. Barley accounts for nearly half of the total cultivated area in the northern zone.[4] One advantage of barley is that it can be cut while green, thus making space for summer crops. When barley is cut green, it is toasted before it is milled, and then is mixed with butter to form a paste. Wheat is more highly prized, but is less successful on thin residual soils. In many areas wheat S [243] [262] [574] flour is used only as a flavoring and leavening agent. Rye is grown in the Sanhajan highlands, but is not generally regarded as an important food. No one would think of serving rye bread to a guest. At the approach of a visitor, an attempt may even be made to hide all rye bread. When land is abundant, rye may be grown for use as thatch, and the grain is not collected. In the Rif it used to be a

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R [113] [3] On the relationship of economic history and erosion, see Paul Vageler, "Zur Bodengeographie Algiers; Faktoren der Bodenbildung und -verteilung. Die Catena als bodengenetische Einheit," *Petermanns Mitt.*, Ergänzungsheft 258 (1955), 88–99.

R [113] [4] In 1950 there were 373,482 hectares of land under cultivation in Spanish Morocco. *Anuario estadístico, 1952–53*, p. 91, cited in note 1.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2
Senhaja MX4

R 243 171 tradition that rye could be grown on unclaimed land, beyond the reaches of ordinary agriculture.[illegible]

R 245 Hunger or plenty depends largely upon the success or failure of the cereal crop. Tree and garden crops supplement but never supplant the cereals. The most important secondary crops are from fruit and nut trees, which are especially numerous in the western part of the Rif. The most important are the olive, pomegranate, fig, and walnut. Apples and plums are grown by some of the highland tribesmen, who graft them on hawthorns. At lower elevations, especially on south-facing slopes, orange, peach, and apricot trees are occasionally seen.

R [262] R [423] Dried figs and raisins are second only to the cereals as staple foods. The importance of the trees is indicated by the complicated pattern of their ownership. On a given farm, all the trees may belong to an outside party, perhaps the former owner of the land who refused to relinquish title to his trees. One tree may be owned by several people in partnership, and sometimes different people own different branches, or claim parts of the crop on the ground. R [273] At one time the Rifians seem to have used grapes or other fruits to make fermented beverages, for Leo Africanus describes them as being "so excessively given to drink, that they scarcely reserve wherewithal to apparel themselves."[illegible]

R 262 [244] R [443] Irrigated plots in the valleys of Wad Ghis and Wad Nkour produce broad beans, chickpeas, potatoes, onions, tomatoes, peppers, carrots, turnips, and squash. Add eggs, and an occasional feast of mutton or goat meat, and you have the main ingredients of the Rifian diet. In recent years fish have been brought in from Alhucemas to the principal rural markets. Fish are regarded as a delicacy, and are usually fried and eaten in the market place.

R 241 262 261 171 West of the Rif the dietary situation improves, but it becomes more hazardous toward the east. This distinction is based on the differences in precipitation and runoff. In the eastern lowlands, precipitation is too meager for vines and figs, and extensive irrigation is possible only in the valleys of Wad Kert and Wad Moulouya. The tribesmen of Garet suffer from acute want in any unusually dry year, and most adults remember at least one famine. Garet and Gal'aya are northern Morocco's main areas of emigration.

R J S 241 312 In the Sanhajan highlands and in most of Ghmara and Jbala, each hamlet has a reliable source of irrigation water. The main irrigated crops are maize, beans, and squash. The planting of beans between the rows of maize may indicate an unformulated appreciation of the value of pulses as restorers of the nitrogen content of the soil. Perhaps not; for the plants in this New World combination seem to have been introduced as one complex by Andalusian refugees.

S 248 171 In most of the central highlands, and especially in Sanhaja as-Srair, *kif*, or hemp (*Cannabis sativa*), is an important cash crop. It is grown under irrigation during the summer, and is usually planted and harvested at about the same time as maize. After it has been reaped, the stems of the plant are submerged in a stream and held down with stones. After two or three days of soaking, the fibers are separated and used to make cord, mats, and baskets.

J 241 171 Traveling from the central highlands toward the Atlantic lowlands, one notes

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[illegible] C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931), 47–48.

[illegible] Leo Africanus, *The History and Description of Africa* (London: Hakluyt Society, 1896), II, 516.

J 241 171 the gradual decrease in the number of fruit and nut trees. The tribesmen of Jbala and the Atlantic littoral can count on adequate rainfall for a good cereal crop in most years. Moreover, since the summer weather is cooler and more humid than in the interior, crops do not suffer from excessive evaporation. Cereals in winter give way to summer crops of sorghum and chickpeas. The latter are not irrigated, and so there is no need for terracing. Slopes are covered with an irregular patchwork of cultivated plots without walls or ditches. Each hamlet is surrounded by cactus (*Opuntia Ficus-indica*), which is cultivated as a hedge and for its edible fruit.

FARM IMPLEMENTS

R 412 171 The implements used by Moroccan farmers are simple and few, for long-established habit opposes change. There are some general reasons for conservatism, such as the abundance and cheapness of manpower and the stagnation of industry. There are specific reasons as well: the prevalence of steep slopes, of small plots where only handwork is possible, and the difficulty of hauling heavy equipment through mountainous terrain. Implements are limited to mattocks, picks, hatchets, hoes, plows, grist mills, and equipment for pulping and pressing olives. Plowshares and other iron tools are made and repaired by local blacksmiths.

R 407 171 The Moroccan plow is a one-handled implement without wheels, colter, or moldboard. Wings are attached obliquely to either side of the share in order to widen the furrows, though not to reverse the sod. Since there is no harrow, clods are broken with hoes or clubs, and a second plowing is necessary to cover the seed. The share is made from a flat piece of iron hammered over at the edges to form a socket. The plow itself is much the same throughout the northern zone. J [407] [492] The main regional difference is in the manner of yoking. In Jbala plows are fastened to the foreheads of cows or oxen (pl. 4, *b*); neck yoking is practiced elsewhere.[7] Mixed teams are common, combining donkeys, mules, or oxen, or one of these animals with a camel (pl. 4, *b*).

R 412 171 Figure 21 illustrates the main hand tools. The first four (*a–d*) are digging and weeding tools; the complex tool in the fourth sketch (*d*) seems to be restricted to Jbala, for the Sanhajans and Rifians are unable to give it a name. The fifth sketch (*e*) shows an all-purpose grubbing and cutting tool, which the women use J [412] to collect fuel and edible plants. Figure 20, *f*, is the hatchet used by woodcutters in Ktama; 20, *g*, is the ubiquitous sickle.

R 256 171 Milling is ordinarily accomplished with a rotary hand mill consisting of an upper stone, turned with a wooden handle, and a lower stone that remains stationary.[8] In areas of abundant runoff there are also vertical water mills, consisting of a turbine wheel attached to the upper of two millstones, a hopper mounted above the stone, and a feed slot jiggled by the upper stone to ensure an even flow (fig. 22). The lower stone is larger than the upper, and is rimmed with a slightly raised border, broken at one place to allow extraction of the flour.[9] Mills of this

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R [113] [7] For other illustrations of Moroccan plows, see E. Laoust, *Mots et choses berbères: notes de linguistique et d'ethnographie* (Paris: Augustin Challamel, 1920), pp. 275–301.

R [113] [8] This type of mill is illustrated in Ernst Rackow, *Beiträge zur Kenntnis der materiellen Kultur Nordwest-Marokkos: Wohnraum, Hausrat, Kostüm* (Wiesbaden: Otto Harrassowitz, 1958), plate 12.

R [113] [9] The origin and evolution of the rotary hand mill and the turbine mill are discussed at length in L. A. Moritz, *Grain-Mills and Flour in Classical Antiquity* (Oxford: Clarendon Press, 1958).

R 256 171 (423) Mills of this type are usually privately owned, and the owner collects one-tenth of the flour. When there is neither hand nor turbine mill, the women pound the grain with iron bars.

R 245 407 171 The implements used to press and pulp olives are similar to those used in Roman time.[20] The apparatus consists of a mill, a press, and a vat. The millstone lies against a centrally placed revolving post and is turned by means of a horizontal shaft with one end secured in the center post and the other projecting beyond the stone (fig. 23). Mills are used both for bruising the fruit before pressing and later to pulp the pressed fruit for use as cattle fodder. The larger mills are powered by animals, the smaller by hand. The essential part of the press is a large log, held in place by heavy wooden screws, which is forced down on baskets filled with olive mash.

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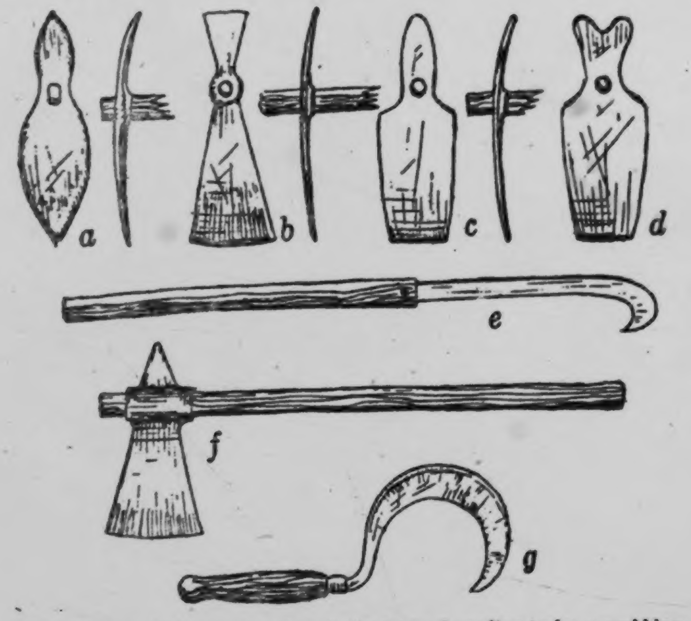

Fig. 21. Farm implements: *a, b, c, d,* digging and weeding tools; *e,* grubbing and cutting tool; *f,* hatchet used by woodcutters; *g,* sickle.

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ROLE OF DOMESTIC ANIMALS

R 231 171 In the statistical report of 1953 the number of domestic animals in Spanish Morocco is given as 1,104,000 goats, 661,000 sheep, 337,000 cattle, 55,000 donkeys, 22,000 mules, and 2,000 camels.[21] The number of goats nearly equals that of human beings. They are kept for their meat, milk, and hides. In many areas the number of goats is limited only by the amount of space available for storage of fodder and by the number of goatherds.

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[20] H. Campe-Fabrer, *L'Olivier et l'huile dans l'Afrique romaine* (Algiers: Service des Antiquités, 1953).

[21] *Anuario estadístico, 1952–53,* p. 131, cited in note 1.

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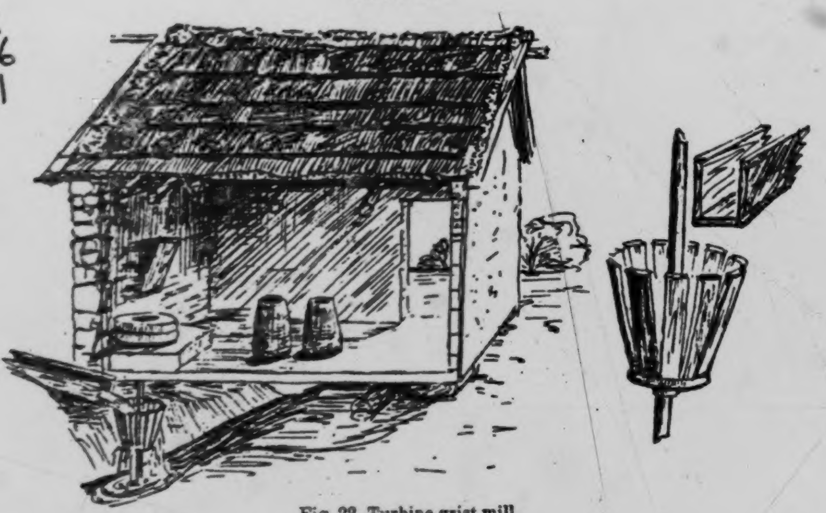

Fig. 22. Turbine grist mill.

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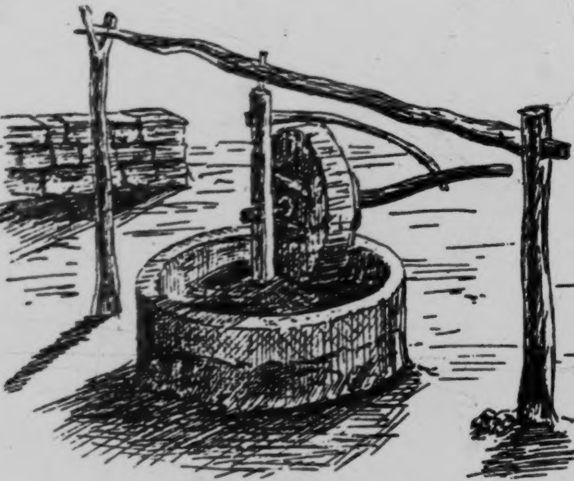

Fig. 23. Olive grinder.

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and by the number of goatherds. The situation in Ktama is representative of the entire highland area. In 1934 this mountain tribe, with a population of 8,389 persons, maintained 20,259 goats in an area of 450 square kilometers.[19] Goats must be brought back to shelter each night; so the radius of their movement is small. The effects of browsing on vegetation will be examined in chapter viii.

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The number of goats decreases toward the Atlantic lowlands and the plains

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[19] Figures from an unpublished report of the Spanish *interventor* dated November, 1934.

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of Garet. In the Atlantic coastal zone most of the surface is cultivated, and little vegetation is left to serve as browse. In the eastern plains goats are replaced by sheep, which begin to outnumber them in the lower parts of the Rif. In the Middle Atlas the raising of sheep is associated with transhumance. This mode of pastoral life is still followed to some extent by the Ulad Stut, Aith Bu Yihyi, and Ibdharsen, who spend the winter months near their cereal fields and the summer months in higher country with their sheep. The routes of migration run from the alluvial lowlands into nearby hills, especially the Kar-Kar range. In recent years the development of new irrigation projects has discouraged pastoral life, and the migration is now limited to a few of the young men and boys.

R 231 171

In the western provinces the main draft animals are cows or oxen. In the highlands and in the eastern lowlands the beasts of burden are donkeys and mules, which are used also for threshing and turning olive grinders. Mules are highly prized, for they can carry a heavier load than donkeys and are more agile and hardy than horses. Since there are few horses in the northern zone, most mules are imported from elsewhere in Morocco or from Spain. Moroccan donkeys are a small but hardy race, able to withstand long journeys with heavy loads. Horses have little value except as symbols of wealth and prestige, and are seldom used in the mountains. At the time of the Spanish conquest there were no horses at all in Aith Bu Nsar, Aith Seddath, and Aith Khannus.[18] Camels are restricted to the plains of Garet, where about 2,000 of them are used as milk, pack, and draft animals. Except for an occasional playful experiment, camels are not ridden.

The pack saddle for donkeys and mules is a heavy object made of cloth stuffed with straw. Panniers of twilled basketry, consisting of a double container connected by a strip of basketry, serve nearly all transport needs. Riders perch on top of the load and let their legs dangle to one side. There is little riding in the mountains, for a healthy man can make better time on foot.

J [562] [482]

Women are the most important burden bearers. Lines of women or girls bent under heavy loads are a common sight everywhere in Morocco. In Jbala they may be seen on any road carrying huge loads of wood and charcoal (pl. 8, *b*).A

The domestic animals in northern Morocco include ferrets used in hunting, dogs, cats, and chickens. The dogs are of two types, one a small cur and the other a larger sheep dog. Chickens are the exclusive property of women, who sell them and their eggs independently of their husbands. Bees are kept in the mountains, but the average tribesman knows nothing of apiculture, and prefers to assign the task to paid specialists.

IRRIGATION AND WATER RIGHTS

R 241 312 171

In Moroccan agricultural terminology the most important distinction is that between *bilad bour*, the land of dry farming, and *bilad saqiyah*, the land of irrigation. By far the greatest amount of irrigated land is watered by diversion of surface runoff (pl. 5, *b*).B Small dams (*mechra*) are used to divert water into ditches (*saqiyah*), which lead to the irrigable land. The ditches often follow tortuous contours, and may extend for several kilometers. The larger streams are flanked by several channels, sometimes five or six, each bringing water from a

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[18] Coon, "Tribes of the Rif," p. 39, cited in note 5.

A, [See p. 132--Analyst] B, [See p. 129--Analyst]

241 312 171 different dam. In deep valleys it is often necessary to move water back and forth across the natural drainage lines. For this purpose, wooden conduits are set on long tripods. Construction of irrigation works begins in the spring, and after a few months of use the water is redirected into its natural course. Since water is required only during the dry season, irrigation systems are designed for the minimum runoff. On steep slopes, water is carefully directed into a series of ponds; check dams are used to impound water from springs. Channels are constructed to lead water to grist mills, but the use of water for milling has a low priority, for most communities also have smaller mills turned by hand.

The construction and maintenance of dams and irrigation ditches require less effort than the construction and maintenance of terraces. With the exception of a few works in the coastal plains, terracing is necessary for irrigation. Since irrigation involves channeling rather than simple flooding, A most terraces have a slight slope and are supported by stone walls (pl. 6, *b*). There is no rotation of crops on irrigated land. In areas of thin residual soil the land is gradually built up by the constant deposition of baskets of mud, another of the backbreaking tasks assigned to the women. Fertilizer, a mixture of sheep dung and ashes, is applied each year.

312 171 [423] The regulation of water rights is a complicated matter.[14] The rights of preference pass from human beings to animals, crops, and industries. The two main rivers of the Rif, Wad Ghis and Wad Nkour, illustrate the problems of management. Wad Ghis has only about a fourth of the flow of Wad Nkour, but its flow is more predictable. Those who irrigate with its waters know the quantity they can expect, and plan accordingly. In normal years Wad Nkour irrigates nearly ten times as much land as Wad Ghis, but in some years it remains little more than a muddy trickle. Hence there is frequent occasion for disputes, which in the past often led to prolonged feuds. In both basins the mountaineers have almost unlimited use of water, while the more numerous plainsmen must be satisfied with what is left. Most Rifian communities have secondary sources of water: wells, springs, and ponds. Each family is allowed a certain time at the water source, and the community as a whole works out the regulations and fines.

An elaborate series of agreements, usually verbal, deals with the construction and maintenance of irrigation works. The labor of construction as well as the necessary reconstruction after heavy rains is done by representatives of the families using the water. [578] Infractions of agreement often lead to differences of opinion about these responsibilities or the period of time water is used. Serious disputes may arise over the outlines of ditches, and for this reason it is necessary to gain the consent of each property owner over whose land the water is to flow. The irrigation turns of the larger communities are regulated by days. Within such communities, individual families are allowed shorter periods of use, usually an hour. The mechanics of irrigation requires the use of the hoe to build up and then destroy a tiny diversion dam.

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[14] [113] In this section I have made use of J. M. Paniagua y Santos, "Notas sobre el derecho consuetudinario de la propiedad en el Rif," *Archivos del Instituto de Estudios Africanos*, 4 (1948), 1–44; D. M. Hart, "An Ethnographic Survey of the Riffian Tribe of Aith Wuryaghil," *Tamuda*, 2 (1954), 55–57; and D. A. Caponera, "Water Laws in the Moslem Countries," *FAO Development Paper 43* (Rome: Food and Agricultural Organization of the United Nations, 1954).

A, [See p. 130--Analyst]

CONTRACTS AND COÖPERATION

675 464 171 241 When tribesmen are unable or unwilling to work their own land, contracts are made between the wealthier and the poorer members of a community; those who have little land or equipment hire themselves out to those who have more. Farmers who have more animals than they or their sons can manage, make agreements with others to care for the herd. The hired shepherds, while the animals are in their hands, receive part of the milk and butter, some of the young that are born, and, if the animals are sold, a share of the profit. The shepherd receives part, sometimes half, of the wool. Full-time employment as a shepherd is considered rather degrading, and for this reason it is the common occupation of exiles and orphans.

Vegetable gardens, orchards, and fields may be cared for by hired laborers. If their job entails the difficult task of setting up terraces, they may get up to a third of the crop. If they perform all the operations necessary for cereal cultivation, they receive a fifth of the crop. If the hired hand needs an assistant during the reaping, the latter is paid with a tenth of the harvest. Associations of this sort are not common; farm labor is ordinarily done by the landowner and his sons.

476 241 171 A second type of association takes place when two farmers own plots of about the same size but do not have enough animals or equipment to work their land independently. The two farmers join forces, each supplying his share, and the harvest is divided between them. This form of coöperation is common when a farmer has only one draft animal. In irrigated areas, one man may supply the land and part of the seed, and another the rest of the seed, the animals, and the plow. Since most communities are kinship groups, coöperation of this sort is usually among brothers or cousins.[15]

INHERITANCE

428 171 The inheritance of property[16] in most of Morocco follows standard Maliki practice, which allots a share to each son equal to that falling to two daughters. When a man dies his widow first receives one-eighth of his property and the remainder is divided among the sons and daughters. All sons inherit equally, as do all daughters. If a man dies leaving a widow and daughters only, the widow gets one-eighth and the remainder is divided into three parts, of which the daughters receive two and the father's brother one. If the father has no brothers, the rest (aside from the widow's share) goes to the daughters. If he does have brothers, and dies leaving only one daughter, she receives half of the property (minus the widow's share) and the brothers get the other half. If a man dies leaving no children, his widow receives a fourth of his property and the rest goes to the brothers. If a man with children dies prior to his father, the children have no right to the property and receive shares only if the grandfather agrees to such a division.

[423] Moroccans are very reluctant to divide up their land. When brothers inherit land they customarily work it jointly, the eldest brother acting as a substitute

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[113] [15] On contracts and coöperation, see also A. Sánchez Pérez, "Aprovechamientos comunales y formas de cooperación en el Rif," *Selección de conferencias pronunciadas en la Academia de Interventores durante el curso 1950–51* (Tetuán: Imprenta Cremades, 1951), pp. 95–104.

[113] [16] This paragraph is based upon the remarks of D. M. Hart in *Morocco: Subcontractor's Monograph* (New Haven: Human Relations Area Files, 1956), pp. 141–143.

428 423 171 for the father. Division takes place only if the brothers quarrel. Since daughters nearly always marry into other communities, they are usually induced to sell their land.

HUNTING AND FISHING

224 171 In autumn and winter most men, and especially the mountaineers, spend as much time as possible in search of game. Their chief quarry consists of rabbits, pigeons, and partridges; in former generations they also hunted wild boar, aoudad, and gazelle.[37] Rifles, nets, traps, strones, and clubs are used in hunting. Game may be driven into a net at the base of a palisade. Those who can afford rifles shoot their game, and a generation ago hunters made proficient use of flintlocks. The best time for hunting rabbits is after a snowfall, when they can be traced to their nests. In the Sanhajan highlands such periods are marked by the scurrying about of numerous hunting parties and the incessant barking of dogs.

It is difficult to say whether hunting should be described as a phase of livelihood or merely as a sport. Game evidently makes an appreciable contribution to diet only in the highlands, and even there the year's catch may be limited to a
[576] few rabbits and birds. Yet one of the highest compliments you can pay a Moroccan is to call him a "great hunter," and many an evening is spent listening to hunting adventures. Game is usually pursued during the idle period, after the cereals have been sown and before it is time to think of the summer crops. Interest in markamanship is associated with the old tradition of the gentleman warrior.
[411] To the young Rifian, who grows up hearing tales of feuds and wars, there is no greater pleasure than to possess a fine rifle. This seems to have been the motivation of many of the boys who joined the Spanish army or the native *mehalla*.

226 171 Fishing takes place all along the Mediterranean coast. Most of the catch is obtained by seining small fish near the shore. The seine, made of hemp, is carried out about a hundred meters in a small boat. It is attached to two ropes held by men on the beach. When the boat has reached the end of the ropes, the seine is let out in a semicircle. The ropes are then pulled in, gradually lessening the distance between them. When the net is beached, the fish are scooped up in baskets and put in a common pile, later to be divided among the families assisting in the catch.[38]

[175] In the journal of Leo Africanus are several accounts which suggest that fishing was an important industry in the sixteenth century.[39] At Peñón de Vélez he found "such abundance of fish, that one man alone is not able to draw up a net." He notes that fish from Peñón de Vélez were "salted and sent up into the mountains." At Terga, near Wad Lao, most of the inhabitants were fisherman "who, getting great abundance of fish, salt them and carry them to sell almost a hundred miles southward." At Tiguisas, on the Ghmaran coast, all the inhabitants were "fishers and seafaring men," and the smell of their fish "miserably infecteth the whole province." Even if these reports are exaggerated, it seems likely that fishing was

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[113] [37] For a Spanish sportsman's account of game in northern Morocco see G. Durán Pulís, *La caza en Marruecos* (Las Palmas: Imprenta Minerva, 1955). Note also the brief remarks of Coon, "Tribes of the Rif," pp. 37–38, cited in note 5.

[113] [38] On the details of this operation, see Ignacio del Cubillo, "Actividades marítimas de la zona de protectorado de España en Marruecos," *Conferencias desarrolladas en la Academia de Interventores durante el curso de 1947* (Tetuán: Imprenta del Majzen, 1948). The boat is illustrated in Rackow, *op. cit.*, plate XLIX, cited in note 8.

[39] Leo Africanus, *The History and Description of Africa*, II, 517–520.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
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226 171 more important at that time than it is today. In chapter vii evidence will be presented to show that the same coastal area was once an important center of shipbuilding.

S [226] [824] [171] Fresh-water fishing seems to be restricted to a few streams in the mountains of Ghmara and Sanhaja as-Srair. The Sanhajans make use of the toxic roots of *Daphne Gnidium* (Arabic *mat'nən*) to stun fish, a practice that has been observed also in Sardinia, Portugal, and Spain.[illegible]

UTILIZATION OF WILD PLANTS

R 757 824 171 The average Moroccan woman can identify at least a hundred plants, and many are thought to have medicinal or magical qualities. To cure an ear infection, the ear is plugged with a mixture of butter and the ground leaves of *Ruta Montana*. The cure for a cold is to induce sweating by drinking milk or tea heavily seasoned with *Mentha pulegium*. A wound is cleaned with the leaves of *Inula viscosa*, and the leaves of other plants are worn under headgear to cure or prevent headaches, or in slippers to reduce fatigue. The number of similar ideas is limitless.

R 222 262 171 [137] Many wild plants have food value, and are collected even when regular harvests are bountiful. The list of such foods includes the seeds of several species of *Cistus* (*C. albidus*, *C. laurifolius*, *C. ladaniferus*), the sweet acorn of *Quercus Ilex*, the fruit of *Arbutus Unedo*, the roots of *Halimium lasiocalycinum*, and the berries of *Rubus ulmifolus* and *Crataegus laciniata*. Moroccans eat the bud of the palmetto. Acorns and *Cistus* seeds seem to be the most important famine foods.

MARKETS

R 484 171 It would be a mistake to conclude that rural communities in northern Morocco live in complete isolation. Moroccans are fond of travel, and the men, at least, have some time to satisfy their wanderlust each year. There are few men, even in the remote highlands, who have not visited at least one city. But when a Rifian or Sanhajan sets out for Fez or Tetuán he is likely to be more interested in sightseeing than in shopping. He may bring back a new cloak for himself or a piece of costume jewelry for his wife, but more often returns only with accounts of strange sights and tales of adventure.

R 438 439 171 A rudimentary system of trade does exist. A few manufactured articles are found in most homes, and some communities produce marketable goods. For example, the village of Mediuna, just south of Cape Spartel, is engaged in quarrying millstones from the Caves of Hercules.[illegible] Here they find a gritty conglomerate that is ideal for milling. The *m'allimin* (masters) who hew out these stones transport them on muleback to Tangier, whence they are traded throughout northern Morocco. Rifian women spend some time making pottery. During the idle months of winter, after the cereals have been harvested, Rifian men work on mats and baskets. Leatherwork is done at Taghzut, and winnowing forks are made at Ktama. Yet none of these activities seriously disturb the subsistence orientation of rural life. Specialization of this sort supplements but never supplants agriculture. The abiding concern of all tribesmen is with their fields.

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[illegible] R. F. Heizer, "Aboriginal Fish Poisons," *Smithsonian Inst. Anthro. Papers*, 38 (1953), 263.

[illegible] C. S. Coon, *The Seven Caves: Archaeological Explorations in the Middle East* (New York: Alfred Knopf, 1957), p. 45; E. Cecil Curwen, "Tangier Quern-Quarry," *Antiquity*, 119 (September, 1956), 174 and plate VII.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Senhaja MX4

R 443 438 439 171 The introspective character of rural Morocco is enhanced by the weekly trading market or *suq* (plural *aswaq*). These markets attract urban merchants, craftsmen, and entrepreneurs, but their principal function is to serve as outlets for the products of local specialization. One family comes to market with a basket of figs, and another with a pannier of walnuts. After an interval of haggling, each leaves with the specialty of the other. Exchange of this sort helps to add variety to the diet, and encourages an intelligent appraisal of local conditions of soil and climate. Staple foods seldom enter into this exchange. The goal of each community is to be self-sufficient in breadstuff. A few commodities, such as sugar, salt, tea, and kerosene, are imported from the cities, but the chief function of the weekly market is to satisfy the modest wants of dispersed communities engaged in subsistence agriculture.

R 443 171 [805] Markets are held in the open, at predetermined sites that are deserted during the rest of the week. In each tribal area one or more sites are reserved as market places and named as follows: *had* (Sunday), *tnine* (Monday), *tlata* (Tuesday), *arba* (Wednesday), *khemis* (Thursday), *jema* (Friday), and *sebt* (Saturday).[a] R [571] On the morning of the appointed day, streams of people converge on the market place. The *suq* is much more than a market in the economic sense of the word; it is also a social and political assembly of great importance in tribal life. Market day is the time for legal transactions and all manner of negotiation. By nightfall tribal authorities have resolved most of the problems of the week.

R 443 438 171 439 There is great variation in the size and influence of markets. In 1949 authorities of the Spanish protectorate made a study of the volume of business transacted at each *suq*. About a hundred markets were located; the annual volume of business, including barter, averaged about 10,000,000 pesetas per market. About a fourth of the markets had an annual business estimated at more than 65,000,000 pesetas (table 5). Most of the larger or regional markets are in the populous Rif (fig. 24). S [443] [438] [439] In the sparsely settled area of Sanhaja as-Srair, only one market, Tlata Ktama, serves as a trading center for more than one tribe. Khemis Izagan (pl. 7, *b*), with trade estimated at 3,000,000 pesetas, is typical of the smaller local markets.

Each market has four main functions: (1) distribution of local products, (2) exchange of rural surpluses or specialties for urban goods, (3) circulation of articles such as pottery and millstones from villages which specialize in making them, and (4) dissemination of foreign imports. The larger markets differ from the smaller in their greater emphasis on the latter two functions. Moreover, the larger markets are usually located at the convergence of communication lines and on the frontiers of complementary production zones.[b]

EMIGRATION

R 161 241 433 171 Unfortunately, the weekly markets do not compensate for uneven distribution of population and productive land. Few communities are able to accumulate

[TEXT CONTINUED ON PAGE 93]

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[a] On French maps the names of the days of the week appear as *had, tnine, tleta, arba, khemis, djemaa,* and *sebt;* on Spanish maps the usual spellings are *had, tenin, telata, arbaa, jemis, yumaa,* and *sebt.*

R (113) [b] On the location and function of markets and the changes caused by recent improvement in communications, see M. W. Mikesell, "The Role of Tribal Markets in Morocco," *Geog. Rev.*, 48 (1958), 494–511.

7: Mikesell K-4,5 (1955-1957) 1961

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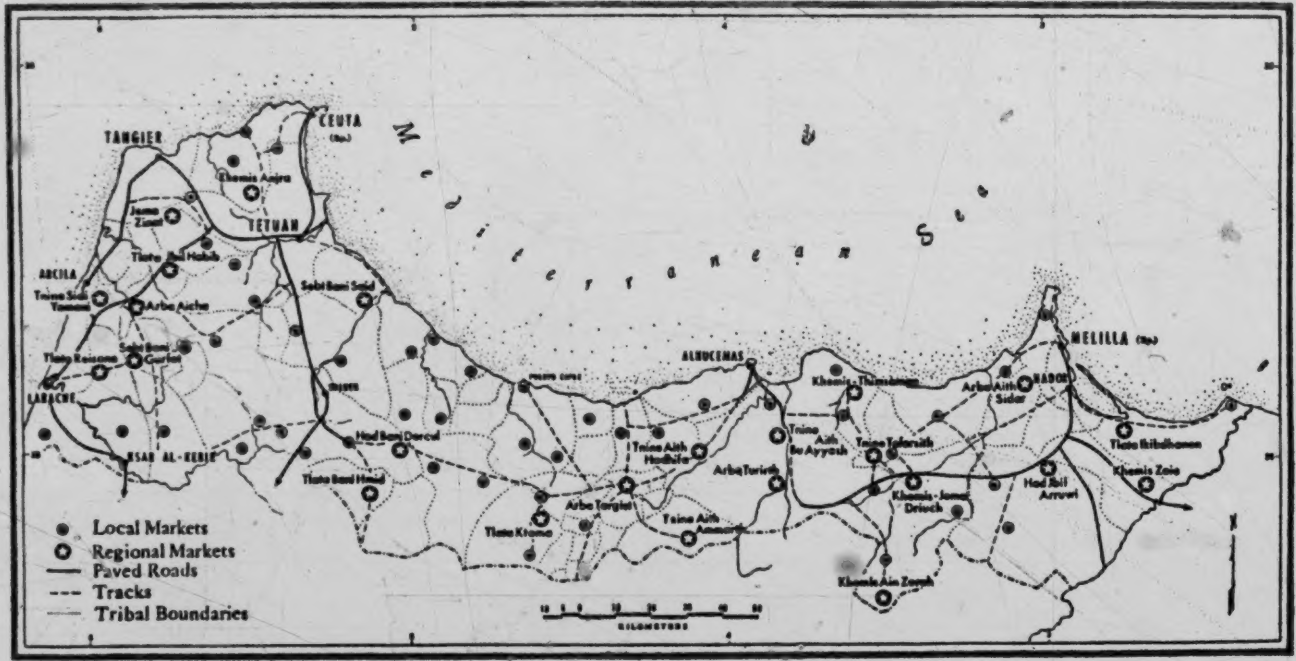
TANGIER
CEUTA (Sp.)
Mediterranean Sea
Khemis Anjra
TETUAN
ARCILA
Tnine Sidi Yamani
Arba Aiche
Sebt Bani Said
Sebt Bani Gorfet
Tlata Raisana
LARACHE
KSAR AL-KEBIR
Had Bani Derkul
Tlata Bani Hmid
Tlata Ketama
Arba Targist
Tnine Aith Hadhifa
Tnine Aith Ammart
ALHUCEMAS
Arba Taurirt
Tnine Aith Bu Ayyash
Khemis Thamsaman
Tnine Tafarsith
Khemis-Jemaa Driuch
Khemis Ain Zorah
Arba Aith Sidar
NADOR
MELILLA (Sp.)
Had Jbil Arruwi
Tlata Ibibdhanen
Khemis Zaio
● Local Markets
✪ Regional Markets
— Paved Roads
--- Tracks
Tribal Boundaries
KILOMETERS

Fig. 24. Northern Morocco: tribal markets.

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241 surplus food for lean years. Many tribesmen, especially the Rifians and the in-
433 habitants of Garet and Gal'aya, live under the constant threat of famine. Every
171 failure of the cereal crop causes great suffering. Even with resources developed
[131] to the limit, these areas would still be unable to provide full employment or full
R 161 nutrition for their expanding populations. The rate of population growth through-

TABLE 5

VALUE OF TRADE AT REGIONAL MARKETS IN 1949

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Market	Volume of trade (pesetas)
Jbala—Lukkis	
Sebt Bani Said	43,000,000
Tlata Jbil Habib	89,000,000
Jema Zinat	80,000,000
Khemis Anjra	60,000,000
Tnine Sidi Yamani	117,000,000
Tlata Reisana	102,000,000
Sebt Bani Gurfat	82,500,000
Arba Aicha	68,500,000
Ghmara—Sanhaja as-Srair	
Had Bani Dercul	57,000,000
Tlata Bani Hmid	84,000,000
Tlata Ktama	65,000,000
Arba Targist	166,000,000
Rif—Garet—Gal'aya	
Tlata Aith Hadhifa	88,000,000
Arba Turirth	122,000,000
Tnine Aith Bu Ayyash	109,000,000
Tnine Aith Ammarth	65,000,000
Arba Aith Sidar	105,000,000
Khemis-Jema Driuch	138,000,000
Khemis Ain Zōrah	107,000,000
Had-Tlata-Khemis Thimsaman	240,000,000
Tlata Ikibdhanen	104,000,000
Had Jbil Arruwi	101,000,000
Tnine-Khemis Thafarsith	78,000,000
Khemis Zaio	90,000,000

SOURCE: J. Caballo Alcaraz, *Apuntes de geografía de Marruecos* (Tetuán: Editora Marroquí, 1951), pp. 157-160.

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161 out northern Africa must be described as alarming. In Morocco the mean annual
increase is 1.5 per cent. This rapid increase creates serious economic problems,
all the more so on account of the youth of the population, of whom 41 per cent
are less than fifteen years old.[28] The spread of preventive medicine and the per-
sistence of such social practices as early marriage and easy repudiation of sterile
R wives accentuate this trend. The cultivated area of northern Morocco has doubled
[311] in the last three decades,[29] but many tribes still find it impossible to grow enough
[171] food.
[433]
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[28] Nevill Barbour, ed., *A Survey of North West Africa (the Maghrib)* (London and New York: Oxford University Press, 1959), p. 81.

[29] *Anuario estadístico, 1952–53*, p. 91, cited in note 1.

161 221 464 The answer to this dilemma, if it may be called an answer, is emigration. In the decade preceding the current disorder, more than 30,000 Rifians went to Algeria each year to work on French farms. The main drift took place during the slack winter season, but smaller groups migrated at other times of the year. Few Moroccans thought of emigration as a permanent change. They were hired by members of their own tribe appointed to serve as contractors, and messengers visited them regularly to collect money for the families left at home. Each tribe had its special place of employment. The Aith Warishik went to Sidi bel Abbes, the Aith Tuzin to Tlemcen, the Thimsaman to Blida and Ain Temouchent, and the Gal'ayan tribes to Oran.[illegible] The largest number of emigrants were recruited from the Aith Said, and it is not a coincidence that the territory of this tribe includes spectacular badlands. From the standpoint of the French farmer this movement was a blessing, for the Moroccans worked harder than the Algerians [167] and were satisfied with less pay. The tribesmen of the western Rif did not join in the seasonal movement to Algeria, but many of them migrated to Tetuán and Tangier.[illegible]

161 167 171 These movements are manifestations of a general trend. The oasis dwellers of the Mzab have long practiced emigration as a solution to their problem of overpopulation. The Mozabite is a farmer in his youth and again in old age; during the middle years he may be a bus driver, a shopkeeper, or a mechanic.[illegible] The same tradition is found among the craftsmen of Taghzut and some of the Shluh tribesmen of the Anti Atlas. Emigration is not a new development, but in recent years it has been practiced on an unprecedented scale.[illegible]

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[113] [illegible] F. Benedicto Pérez, "Trabajadores rifeños en Argelia," *Conferencias desarrolladas en la Academia de Interventores durante el curso de 1948* (Tetuán: Imprenta del Majzen, 1949), pp. 5–17.

[113] [illegible] D. M. Hart, "Notes on the Rifian Community of Tangier," *Middle East Jour.*, 11 (1957), 153–162.

[113] [illegible] In the Mzab the tradition of emigration for men is combined with a tradition that women must not leave the oasis. See Karl Suter, "Die Ortsgebundenheit der Frau bei den Mozabiten," *Geographica Helvetica*, 12 (1957), 102–114.

[113] [illegible] On emigration see also Günter Glauert, "Veränderungen in den Bevölkerungsstruktur Nordafrikas in den letzen Jahrzehnten," *Die Erde*, 88 (1957), 298–319; René Raynal, "Déplacements récents et actuels des populations du bassin de la Moulouya (Maroc oriental)," *Comptes Rendus du Congrès International de Géographie, Lisbonne, 1949* (Lisbon, 1952), IV, 67–80; and J. C. Petit and Castet Barou, "Contribution à l'étude des mouvements de la population marocaine musulmane et de l'exode rural," *Bull. Economique et Social du Maroc*, 68 (1955), 423–459.

CHAPTER VII

EFFECTS OF SETTLEMENT ON THE LAND

121 311 EVIDENCE of deforestation has already been considered briefly. In chapter ii the effects of burning and browsing were mentioned parenthetically in discussing the distribution of forest and scrub. Now that man's activities have been described, the discussion can be resumed.[1]

HISTORICAL EVIDENCE

175 311 When the Emperor Claudius created the province of Mauritania Tingitana in A.D. 46, timber resources were nearly exhausted in the eastern Mediterranean basin. The cedars of Lebanon had been retreating since the time of King Solomon. Homer refers to "tall pines and spreading oaks" on the now virtually barren island of Sicily.[2] Plato, in the fifth century B.C., deplores the destruction of the forests in Greece,[3] and a century later Theophrastus complains that the supply of ship timber is limited.[4] In Pliny's time the thuya forests on Mount Ancorarius were already exhausted.[5] At the dawn of the Christian era, Roman ships were sailing as far away as the Caucasus ports to obtain timber, and Roman architecture eventually had to be modified to compensate for the scarcity and increasing price of wood. Large quantities of wood were needed to heat baths, and trees were cut everywhere for charcoal. Cork and tanners' bark were persistent items of trade. In both the Roman and the Carthaginian realms, perhaps the greatest wood-devouring industry was shipbuilding. As Miss Semple suggests, "A multitude of fishing smacks, naval vessels, merchant ships, and coastwise transportation boats kept up the demand for fir, pine, cedar, and minor woods which entered into their construction."[6] The coniferous forests were further depleted by the steady demand for pitch, resin, and tar. It would be rash to make sweeping generalizations on the basis of a few references after the lapse of centuries; yet it may be asserted that deforestation was evident in classical times, especially in the areas of Roman and Carthaginian influence, and that no forested area accessible to lumber merchants was ignored.[7]

In the time of Homer and Hesiod the Moroccan mountains were still confused with the peak of Tenerife, of which some indistinct knowledge had been gained from Phoenician sources.[8] The references to Atlas cedar in Latin literature usually refer to forests in the more familiar province of Numidia. According to Pliny,

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175 [1] For additional illustrations, see M. W. Mikesell, "Deforestation in Northern Morocco," *Science*, 132 (1960), 441–448.

113 [2] *Odyssey*, IX; *Iliad*, XII, XVI, XX.

311 [3] *Critias*, 111 A–D, trans. A. J. Toynbee in *Greek Historical Thought* (New York: Mentor Books, 1952), p. 146.

[4] *Enquiry into Plants . . .*, IV, 5.

[5] *Natural History*, XIII, 15. Most authorities place Mount Ancorarius in the Ouarsenis Massif of Algeria. Paul Boudy, *Économie forestière nord-africaine* (Paris: Larose, 1948–1955), I, 223.

[6] E. C. Semple, *The Geography of the Mediterranean Region: Its Relation to Ancient History* (New York: Henry Holt, 1931), p. 282.

[7] H. C. Darby, "The Clearing of the Woodland in Europe," in W. L. Thomas, Jr., ed., *Man's Role in Changing the Face of the Earth* (Chicago: University of Chicago Press, 1956), pp. 183–216.

[8] Cf. George Rawlinson's annotation of Herodotus, *History*, IV, 184 (London: J. M. Dent and Sons, 1910); and R. Thouvenot, "La connaissance de la montagne marocaine chez Pline l'Ancien," *Hespéris*, 26 (1939), 113–121.

175 beams of Numidian cedar were used in the temple of Apollo at Utica.[9] Strabo
311 describes Mount Abyla (Jbil Hacho) on the Ceuta promontory as being clothed with a mantle of great trees.[10] This specific reference is of major interest, for now only a few clusters of Aleppo pine appear on that promontory. The description of forest at Cape Cantin, near Safi, in the periplus of Hanno is significant, also, for no such description could be recorded today.[11] It is known that the African provinces contributed wood to the Roman baths, and it may be inferred that some of that wood came from Mauritania. Thuya beams were imported for the roofs of temples, palaces, and other fine buildings, and the same wood was preferred for cabinets and other furniture.[12] The pine and thuya of the Rif probably were exploited in shipbuilding, and there would have been a demand for fuel and lumber at each of the Tingitanian settlements.

The first Arab invasion of Morocco in A.D. 648 and the great immigration of bedawin tribes in the eleventh century mark the beginnings of two trends that have an important bearing on this discussion. The first Arab invaders were pious and learned men who sought to build an urban civilization comparable to that already established in the Muslim heartland. In each of the new cities wood was needed for building, for fuel, and for a hundred other domestic and industrial purposes. The great demand for tanbark at Marrakech, Fez, Salé, and Tetuán soon resulted in the destruction of large stands of holly oak and cork oak. Planks of cedar were needed for city gates, and beams of cedar or thuya were placed in mosques and palaces. Slender riparian trees were used in smaller structures, and charcoal braziers burned in every home. By the end of the tenth century the Moroccan cities had become "devourers of wood."[13]

Many authors, seeking a dramatic explanation of Moroccan deforestation, attribute most of the adverse change to the bedawin; at least one author refers to their "hatred of trees."[14] Ibn Khaldun noted the effects of the invasion of northern Africa by the Bani Hallal and Bani Soleim: "When the Arabs [i.e., bedawin] conquer a country, ruin quickly descends upon it"; after three hundred and fifty years of unrestricted nomadism in his native Tunisia, "ruin and devastation" still prevailed.[15]

Pastoral destruction accelerates very rapidly, for the havoc wrought by overgrazing lies not only in its destruction but also in its prevention of new growth. But it is seldom possible to distinguish one among the several causes of deforestation. There is something appealing in the thought that the Vandals or the bedawin "destroyed" the north African forest, just as there is in the notion that the Mesopotamian irrigation system was "ruined" by the hordes of Hulagu Khan.

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175 [9] *Natural History*, XVI, 40.

311 [10] *Geography*, XVII, 3.

[11] For an English translation, see B. H. Warmington, *Carthage* (London: Robert Hale, 1960), pp. 62–64.

[12] Cf. Vitruvius, *Architecture*, II, 4; and Pliny, *Natural History*, XVI, 231, XXXIII, 146.

[13] Jean Despois, *L'Afrique du Nord* (Paris: Presses Universitaires de France, 1949), p. 84.

[14] A. Bernard, *Afrique septentrionale et occidentale* (Paris: Armand Colin, 1937–1939), I, 65.

[15] Charles Issawi, trans., *An Arab Philosophy of History: Selections from the Prolegomena of Ibn Khaldun of Tunis (1332–1406)* (London: John Murray, 1950), pp. 54–58. Cf. Boudy's comment, *op. cit.*, I, 228; cited in note 5: "C'est incontestablement de cette période que date la grande déforestation du pays, résultat inéluctable des incendies répétés et du pâturage sans mesure." In "Le déboisement de l'Afrique du Nord," *Rev. des Eaux et Forêts*, 79 (1941), 471–487, Paul Buffault also blames the bedawin, but his argument is weakened by use of discredited notions of climatic change.

175 311 Both of these alien invasions merely accelerated processes of destruction or decay that had been going on for a long time.

Several of the Arab chroniclers refer to woods in areas that are now deforested. The celebrated text of the seventh century in which northern Africa is described as a land of "continuous shade" is doubtless exaggerated,[26] for the Maghrib would appear to be lush and verdant even today after a long trip through the deserts of Egypt and Libya. Later accounts are more specific, and several of these refer to northern Morocco. In the latter half of the eleventh century Al-Bekri describes an "extensive forest" near Qasr al-Awwal (Ksar as-Srair).[27] Today this area is covered by a shrub formation, interrupted only by scattered clumps of cork oak. In the middle of the twelfth century Al-Idrisi describes Ghmara as a "mountainous and wooded" land.[28] A generation later another author refers to forest in the Ghmaran mountains, and indicates that wood from this forest is used in the construction of boats.[29] In the fifteenth century Al-Ansari found an "abundance of trees" near Ceuta, where forest is now limited to a few stands of cork oak and Aleppo pine.[30]

In the sixteenth century the forests on the Rifian coast began to attract the attention of the Spanish. Moorish pirates had been raiding the Andalusian coast and it was virtually impossible for an unarmed ship to sail through the Strait of Gibraltar. The distress of the Spanish resulted not only from the daring of the Moors but also from the fact that the latter's boats were astonishingly fast and maneuverable. Contemporary accounts praise the "alerce" wood used in the Moorish boats and rate it higher than Spanish oak or pine. Opinions differ as to the identification of this wood, but descriptions of its distribution and properties strongly suggest the Barbary thuya (*Callitris articulata*).[31] In 1505 an agent of Fernando el Católico suggested that an expedition should be directed against the Moroccan coast at Peñón de Vélez because large quantities of alerce were to be found there and not elsewhere on the coast.[32] The latter assertion is almost certainly an error, for thuyas are still scattered over most of the Rifian littoral. At this time the interest of the Spanish seems to have been defensive, but they may have been interested in alerce as a source of timber for their own fleet. In the days of the Armada, Spain looked as far away as the Baltic for suitable timber.[33]

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175 [26] E. Lévi-Provençal, "Un nouveau récit de la conquête de l'Afrique du Nord par les arabes," *Arabica*, 1 (1954), 40.

311 [27] Al-Bekri, *Description de l'Afrique septentrionale* (Algiers: Adolphe Jourdan, 1919), p. 206.

113 [28] Al-Idrisi, *Description de l'Afrique et de l'Espagne* (Leiden: E. J. Brill, 1866), pp. 203–204.

[29] J. Vernet Ginés, "Marruecos en la geografía de Ibn Sa'id al-Maghribi," *Tamuda*, 1 (1953), 255.

[30] E. Lévi-Provençal, "Une description de Ceuta musulmane au XVᵉ siècle," *Hespéris*, 12 (1931), 145–176.

[31] After initially labeling alerce as thuya, T. García Figueras, *Misceláneas de estudios históricos sobre Marruecos* (Larache: Editora Marroquí, 1949), pp. 143–148, suggests that this name is related to *ars* (Arabic for "cedar"), an opinion shared by J. Corominas, *Diccionario crítico etimológico de la lengua castellana* (Bern: Francke, 1954). But it is unlikely that the cedar ever grew on the Mediterranean coast. Actually, there is little to choose between *ars* (cedar) and *ar'ar* (thuya) as possible roots of "alerce." The Latin *Larix* (larch) seems more plausible, but there are no deciduous conifers in Morocco.

[32] The reference is to "madera de los alerces, que los hay en Vélez y muchos y no en otra parte de la costa." For the complete text, see M. Jiménez de la Espada, *La guerra del moro a fines del sigol XV* (Ceuta: Imprenta Africa, 1940), p. 16.

[33] R. G. Albion, *Forests and Sea-Power* (Cambridge, Mass.: Harvard University Press, 1926), p. 183; Hellmuth Hopfner, "La evolución de los bosques de Castilla la Vieja en tiempos históricos," *Estudios Geográficos*, 15 (1954), 415–430.

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A number of references to vegetation in northern Morocco appear in the journals of Leo Africanus.[illegible] In his introductory account of northern Africa the mountains of Barbary are described as "woody on all sides" and as being "replenished with woods and lofty trees."[illegible] But on the eastern frontier of Barbary, close to Libya, he found "certain barren hills destitute of trees, upon the lower parts whereof grow nothing but unprofitable thorns and shrubs."[illegible]

Leo's account of the "Kingdom of Fez" reveals his careful observation during extensive travels in northern Morocco.[illegible] "The Rif Mountains," he notes, are "replenished with most beautiful and straight trees." On the banks of Wad Lukkus he found "huge and solitary woods haunted with lions and other wild beasts." In 1562 a Portuguese attempt to supply the fort at La Graciosa was thwarted, according to Leo, when the Moors cut down "all the woods adjoining the river," causing it to be "choaked and stopped up with great trees." In this context it would seem that Leo refers to riparian forest, but he may be describing an extensive stand of cork oak. This forest did not extend over the entire Atlantic littoral, for he later notes that Arcila "sustaineth great want of wood" because it "standeth almost ten miles from the mountains." Then as now, the people of Arcila imported charcoal from the cork forests south of "Larais" (Larache).

Leo's description of Anjra shows an alertness to change. "In times past," he notes, the mountains of Anjra "greatly abounded with woods, which, being cut down by the inhabitants, were sent to Casar [Ksar as-Srair] for the building of ships, which at that time had a great fleet belonging thereunto." This passage seems to imply that ships were no longer being built or that shipbuilding had declined. A further implication might be that shipbuilding had declined because suitable timber had become scarce. If so, the depletion of the forest must have taken place between the thirteenth and sixteenth centuries.[illegible]

Proceeding eastward on the Mediterranean coast, Leo stopped at "Terga," a few kilometers beyond Wad Lao and noted "not far from this town" an "abundance of wood upon the ragged and cold mountains." A similar observation is recorded at "Velles de Gumera" (Vélez de la Ghmara): "Upon the mountains grow great store of wood, very commodious for the building of ships and of galleys"; and he adds that the inhabitants of these mountains "are almost wholly employed about carrying of the said wood from place to place."[illegible] The reference to lumber trade is not surprising, for the Sanhajans probably carried cedar planks from market to market long before the sixteenth century; but it is surprising to find a suggestion that the mountain tribes were "almost wholly employed" in this trade.

The next account refers to "Ielles," a village located on the coast between Vélez and the bay of Alhucemas. The mountains south of this place are described as being "full of pine trees," and Leo found "great store of wood" in the moun-

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[illegible] Leo Africanus, *The History and Description of Africa* (London: Hakluyt Society, 1896).

[illegible] *Ibid.*, I, 168–169.

[illegible] *Ibid.*, I, 173.

[illegible] *Ibid.*, II, 494–539, Hakluyt edition. The quotations to follow are taken from Book 3 of the narrative.

[illegible] Vernet Ginés, *op. cit.*, in note 19.

[illegible] In regard to the same place, Mármol (who may have copied Leo) refers to "buen aparejo de madera en las sierras de alrededor, donde hay muchos árboles, alcornoques y alerces para hacer navios." Luys del Mármol Carvajal, *Descripción general de Africa* (Granada and Málaga, 1573–1599), III, chap. 62.

[113]

175 tains of the upper Nkour. The same expression is applied to the mountains on
311 the route between Vélez and Fez (probably the Sanhajan highlands), and to "Mount Seusaoen" (i.e., Shawen, probably Jbil Tisuka). Leo's account of the eastern sector of northern Morocco is very different. The plains of Garet are described as a desert, and the lower Moulouya Valley as being "unpleasant and dry," with "no water but that of the river Muluia."

Accounts of forest in the Rif highlands are to be expected, but it is surprising to find repeated references to forest on the Mediterranean coast. Similar accounts appear in the works of Arab writers of the twelfth and thirteenth centuries, and Strabo describes the Ceuta promontory as being clothed with a mantle of great trees. The frequent mentions of trees near Ceuta suggest a profound modification of vegetation in subsequent years. Accounts of shipbuilding and lumber trade indicate some commercial logging; the retreat of the forest near Ksar as-Srair, Ceuta, and Vélez might have been a direct result of these activities. Leo's reference to "great want of wood" at Arcila suggests that the hills and marine terraces of the Tangier-Tetuán-Arcila triangle had been cleared before his time, but extensive woods still existed in the basin of Wad Lukkus. His evaluation of the Moulouya Valley may have been prejudiced by previous exposure to more verdant areas, but "desert" does not mean forest, or even a rich formation of scrub.

AGENTS AND PROCESSES OF CHANGE

311 In northern Morocco today, the most important agents of deforestation are:
171 (1) domestic and industrial consumption of wood, (2) burning to "improve" pastures and to clear fields for cultivation, and (3) destruction of palatable plant material by sheep and goats. These processes are evident even to the casual observer, but it is difficult to determine their relative importance. Despois believes that the principal causes of deforestation have always been the need for fuel and new land to till.[illegible] Braun-Blanquet describes the Mediterranean garrigues as "zoöbiotically conditioned communities."[illegible] Kuhnholtz-Lordat is convinced that the greatest agent of deterioration has been fire.[illegible]

Each emphasis is supported by abundant evidence, but it may be doubted whether the several causes of deforestation can be treated independently. A series of fires, if not too closely spaced, may not result in deforestation, but burning followed by heavy pasturing inevitably does. Most of the broad-leaf trees in northern Morocco reproduce themselves from shoots after being burned or felled, but in areas overrun by goats the shoots are browsed down and forest degenerates to scrub. In tangled brush formations it is often difficult to tell whether the main destructive agent has been fire, domestic animals, or man.

372
CONSUMPTION OF WOOD

354 Although kerosene lamps burn in many Moroccan homes, charcoal and wood
171 are the only important domestic fuels.[illegible] Butane and electrical appliances are

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[illegible] Despois, *op. cit.*, p. 84, cited in note 13.

[113] [illegible] J. Braun-Blanquet, *Pflanzensoziologie: Grundzüge der Vegetationskunde* (2d ed., Vienna: Springer, 1951), p. 371.

[113] [illegible] G. Kuhnholtz-Lordat, *La Terre incendiée: essai d'agronomie comparée* (Nimes: Editions de la Maison Carrée, 1939), *passim.*

[113] [illegible] Anthracite of excellent quality has been mined at Djerada south of Oujda since 1931, but

372 seldom seen except in the European quarters of the larger towns. When a feast
354 is in prospect, food is sometimes boiled in earthen pots set about an open fire.
171 Wood fires also heat bake ovens. But most if not all Moroccan cooking is done
[252] over a charcoal brazier, consisting of an iron pot and tripod or simply an old gasoline tin. The brazier is used several times a day to boil water for tea; indeed, more fuel is consumed in this process than in cooking. Blacksmiths and other craftsmen rely upon charcoal, and lime kilns are found near every town.

372 Charcoal is a valuable fuel, for it has about twice the heating power of wood
314 and burns without flame or smoke. In Morocco wood is converted to charcoal
171 in shallow pits thinly covered with earth. But this process of partial combustion is extremely wasteful, since much of the volatile material in the wood is lost. The best charcoal is obtained from the denser hardwoods, especially the oaks. *Quercus Ilex* is the preferred wood, and this preference helps to explain the degraded aspect of most stands of this tree. The cork oak, the kermes oak, the oleaster, *Pistacia lentiscus, Rhus pentaphylla,* and *Arbutus Unedo* also yield excellent charcoal. Where the choice of wood is limited, many shrubs are utilized, and all available trees. No reliable estimate of the amount of charcoal annually consumed in northern Morocco has ever been published, but it must be enormous, for a charcoal brazier of some sort burns in every home.[illegible] During any day of
[482] the year, women and animals may be seen carrying loads of wood or charcoal
[492] to the cities and towns (pl. 8, *b*).

342 Mud brick or stone usually forms the walls of houses, but wood is always required for the rafters. In the deforested eastern sector, houses are built long
313 and narrow so that branches and twigs can be used as a covering. When avail-
171 able, slender riparian or coniferous trees are used as rafters, but in most of northern Morocco such trees cannot be obtained.

[137] Riparian forests are rare today apart from some canyons in the mountains, where the remaining stands of *Salix, Alnus, Populus, Vitex,* and *Crataegus* become thinner each year. *Nerium oleander,* the riparian "tree" of the hills and plains, is of little value in construction, and the oleaster and oaks are usually too massive or knarred.

The common type of house in Gal'aya and the Rif is well adapted to an environment poor in timber. In the Rifian dialect the word for "sloping roof" (*thazukha*) is the general word for all roofs, whereas a special word (*asthih*)
[174] is used for the now prevalent flat roofs.[illegible] The fact that the generalized word for roof is the same as that for a sloping one indicates greater antiquity for the latter variety. There is evidence that flat and narrow houses of the eastern type have recently replaced dwellings demanding more wood along the entire western frontier of the Rif.[illegible]

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[113] [372] [354] most of this production has been consumed by factories in the Casablanca district and by the railroads of northern Africa. Fernand Joly *et al., Géographie du Maroc* (Paris: Delagrave, 1949), pp. 135–136.

[171] [113] [illegible] The estimate of "four to five metric tons" published by the Spanish forestry service takes account only of commercial operations. E. Gonzáles Vázquez, *El Marruecos forestal* (Madrid: Ediciones Técnicas, 1945), p. 72.

[illegible] C. S. Coon, "Tribes of the Rif," *Harvard African Studies,* 9 (1931), 69.

[illegible] Coon, *loc. cit.*, traces this change to the burning of houses during feuds in the pre-protectorate period, and to the fact that many families found it difficult to obtain lumber after the end of Abd al-Krim's rebellion. For evidence of changes in recent years, compare his map of house types (p. 71) with fig. 15 of the present study.

313 648 171 The great wooden gates that used to guard the openings of every city wall demonstrate the importance of the lumber trade. Only fragments of these gates still exist, but it is certain that most of them were made of cedar. Logging operations were greatly expanded by the Spanish after the Rifian tribes had been pacified. It is not an exaggeration to say that the mineral deposits and cedar forests of northern Morocco were the only compensations for Spain's investment in colonial prestige. Reliable estimates of the amount of timber cut since the beginning of the protectorate cannot be found, possibly because the Spanish claimed to be conserving and restoring the forests in their zone. With the backing of military force, the Spanish were able to exercise some control over cutting by the native population, but their own work proceeded without interruption or apparent regulation. Spanish officials point out that the forests being exploited were private property and that the forestry service was concerned only with public domain.

In 1956 sawmills operated throughout the year at Tetuán and Targist, and during the summer months trucks heavily loaded with cedar logs could be seen on every mountain road. The fir forests on Jbil Tisuka and Jbil Leshab had not yet been heavily logged when Spanish "protection" came to an end, but the deciduous oaks on Jbil Buhashim had been cut in quantity for use as railroad ties. These operations may have been a brief chapter in the history of the Moroccan forest, but it is probable that the Spanish, with modern equipment, cut more trees in a decade than the local tribesmen could destroy in a century. The effects of Spanish logging are strikingly evident in the Sanhajan highlands, especially on Adrar Dahdoh, Adrar Tidighin, and Adrar Tizi Ifri.

313 171 [185] This harsh judgment applies only to the exploitation of cedar and the deciduous oaks. A modest amount of reforestation was undertaken. A plantation of *Eucalyptus* was established north of Larache; Aleppo pines were planted near Rincón, Alhucemas, Nador, and Melilla; and an effort was made to prevent premature stripping of the cork oak.[illegible]

Profiting from long experience in Algeria, the Service des Eaux et Forêts carried out an elaborate program in French Morocco. The system advocated and partly enforced was based upon periodic and progressive thinnings, which were intended to reconcile the interests of the tribesmen with good forestry practice. If effectively enforced, this method would have permitted the production of fuel without waiting for the normal age of exploitation, and would have improved pastoral conditions by facilitating the movement and supervision of livestock.[illegible]

314 171 311 Tannin is extracted from the roots and bark of all the Moroccan oaks, and this operation frequently results in mutilation or death. The cork oak is especially vulnerable, for tannin is scraped from the delicate inner bark immediately after the corky tissue has been removed. Complete girdling destroys trees, and death may result if more than half of the circumference is damaged.[illegible] The tanners of Marrakech have been responsible for extensive deforestation in the

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[113] [illegible] The program planned by the Spanish forestry service is described in González Vázquez, *op. cit.*, pp. 97–185, cited in note 34; and J. Ruiz de la Torre, *La vegetación natural del norte de Marruecos y la elección de especies para su repoblación forestal* (Larache: Centro de Investigaciones Forestales, 1956).

[113] [illegible] For a brief account of French management, see J. P. Challot, "L'homme et la forêt marocaine," *Rev. des Eaux et Forêts*, 84 (1946), 233–261.

[illegible] Boudy, *op. cit.*, II (fasc. 1), 47 ff., cited in note 5.

314 High Atlas. Deforestation can be traced also to the tanners of Fez and Tetuán.
311 The tanners' guild in Fez goes back to the ninth century, when master tanners
171 gathered at this site from Córdoba, Qayrawan, and distant Iran. Fez leather was once exported as far away as Baghdad, and shoes went to Egypt until the present century. During the peak years of production. Fez craftsmen tanned about 500,000 skins a year. The descendants of the original immigrant craftsmen are still busy making handbags, slippers, and other articles for the tourist and export trade.

It is not surprising that *Quercus Ilex,* an important source of tannin, should now be rare in the hills near Fez and Tetuán. There is good reason to believe that the holly oak once covered these hills. One well-informed botanist asserts that the primordial cover of the limestone mountains south of Tetuán probably was a "climax" forest of holly oak. In Gal'aya and the eastern Rif, careless stripping of the bark of *Rhus pentaphylla,* a source of red dye, destroys many trees; "Morocco leather," a trade name in bookbinding, is customarily made from goatskin tanned with sumac.

EFFECTS OF BURNING

372 In the eastern Rif the plant cover is usually too sparse to maintain a fire, and
241 on the Atlantic littoral there is little land left to clear. But between these areas
171 is a large zone covered with forest or scrub that must be burned before the land can be plowed. Some attempt is usually made to control the spread of fire, but
311 conflagrations develop when tinder-dry shrubs are fanned by brisk winds. Fire is employed also for the "improvement" of pasture, for increased blossoming ("bee pasture"), and probably for the mere pleasure of burning or out of carelessness.

233 The importance of pastoral fires has been emphasized by most students of the
372 Mediterranean landscape, but in northern Morocco fires set to clear away noxious shrubbery or to facilitate movement of stock are less important than agri-
171 cultural fires. Pastoral fires are neither necessary nor desirable where there are
241 goats, for these animals thrive on woody browse and can break through the thick-
311 est scrub. Sheep outnumber goats only in the drier eastern sector, where impenetrable formations are rare. For every fire set to "improve" pasture, probably more than ten are set to prepare new fields for plowing.

372 Whatever its cause, fire is a major agent of deforestation. The difficulty is
311 that there are many kinds of fires: quick fires that run over a thin mantle of vegetation, great conflagrations that consume thicker formations, fires that remain close to the ground, fires that extend to the crowns of trees. It makes a great deal of difference whether fires recur after five or after twenty-five years. Moreover, the important factor may be not the fire itself but what happens to an area after it has been burned.

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[113] R. le Tourneau, L. Paye, and R. Guyot, "La corporation des tanneurs et l'industrie de la tannerie à Fès," *Hespéris,* 21 (1935), 167-240; A. Joly, "L'industrie à Tétouan," *Archives Marocaines,* 8, 15, 18 (1906-1912).

[113] J. Ruiz de la Torre, *El matorral en Yebala (Marruecos español)* (Madrid: Instituto de Estudios Africanos, 1955), pp. 26-27, and the map showing the "natural area" of *Quercus Ilex.*

[113] H. Marc, *Notes sur les forêts de l'Algérie* (Paris: Larose, 1930), p. 396, lists the causes of serious forest fires from 1886 to 1915 as "accidents" (8 per cent), "imprudence" (32 per cent), "intentional" (23 per cent), "unknown" (37 per cent).

[113] G. Kuhnholtz-Lordat, "Influence des feux pastoraux dans la région méditerranéenne," *Jour. d'Agriculture Tropicale et de Botanique Appliquée,* 3 (1956), 785-791.

372 137 311 Plants that are somewhat resistant to fire or are stimulated to multiply and reproduce by fire have been called pyrophytes.[44] There are many kinds of pyrophytes, for resistance to or stimulation from fire may be achieved in several ways. The cork oak could be called a pyrophyte of passive resistance, for it is protected by thick insulating bark. Plants that send out new shoots after their aerial organs have been partly or completely destroyed might be described as pyrophytes of vegetative reaction. Budding may take place above ground, as in the thuya, or below ground, as in the kermes oak, palmetto, madrone, and numerous Mediterranean shrubs. Trees that cast deep shade (e.g., undisturbed holly oaks) could be termed pyrophytes of indirect resistance. Finally, some trees and shrubs that seed heavily and grow rapidly (e.g., Aleppo pine and species of *Cistus*) might be described as social pyrophytes.

372 114 137 311 This classification, derived from the pioneer work of Kuhnholtz-Lordat, has much to recommend it,[45] but, like all classifications, it has some faults. The passive resistance of the cork oak depends upon the lapse of time since the last stripping of the bark. Pyrophytes of vegetative reaction may be destroyed if fires recur in rapid succession. In northern Morocco it is hard to think of a good example of indirect resistance. Some stands of cork oak and holly oak have shaded floors and sparse underbrush, but during the dry season such formations may be inflammable. Again, although the Aleppo pine is an excellent pioneer, it may be exterminated if fires recur in rapid succession or if the young shoots are browsed.

372 137 311 Recurrent burning thus favors some plants and discourages others. Continuous repetition of brush fires produces communities rich in geophytes and therophytes. In much of northwestern Morocco, species of *Cistus* are the first shrubby pioneers.[46] They soon collect in extensive clumps, but die out after ten to fifteen years if not burned again. Large areas in Jbala and Ghmara, now covered with *Cistus monspeliensis*, *C. albidus*, and *C. ladaniferus*, probably were once covered with forests of cork oak or holly oak. Fires usually do not destroy the aerial organs of trees protected by thick bark, but the mortality rate rises sharply immediately after the bark has been stripped.[47]

When aerial organs are destroyed, both cork oak and holly oak reproduce from shoots. An occasional fire may even serve to regenerate a senile forest. But extreme care must be taken to prevent further destruction, for *Cistus*, *Erica*, and other heliophilous shrubs spread over the surface as soon as more light reaches the ground. Since the expanding secondary growth is highly inflammable, this process increases the danger of recurrent fires.[48] After several fires, the mesophytic plants are replaced by species more xerophytic as well as more heliophilous, indicating a change to drier soil conditions.[49]

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[44] Kuhnholtz-Lordat, *La Terre incendiée*, *passim*, cited in note 32.

[45] *Ibid.*, pp. 43 ff.

(113) [46] Because of its rapid growth and abundant crop of seeds, *Cistus* has been used in California to protect denuded slopes. Gustaf Juhren, "The Use of *Cistus* in Erosion Control," *Lasca Leaves*, Spring, 1956, pp. 26–29.

[47] See also Boudy, *op. cit.*, I, 663 ff., cited in note 5; and A. Dugelay, "La remise en valeur des forêts de chênes-lièges incendiées." *Rev. Forestière Française*, November, 1951, pp. 687–694.

[48] Boudy, *op. cit.*, I, 649, describes *Erica arborea* as an "élément ignicole par excellence."

(113) [49] On the effects of fire in similar environments, see A. W. Sampson, *Plant Succession on Burned Chaparral Lands in Northern California* (Berkeley: California Agricultural Experiment Station, 1944); R. S. Adamson, *The Vegetation of South Africa* (London: British Empire Vegetation Committee, 1938); W. B. Turrill, *The Plant Life of the Balkan Peninsula* (Oxford:

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311 The main difference between the effects of fire in broad-leaf forests and in coniferous forests is that the latter, with the exception of the Barbary thuya, do not reproduce by coppice shoots. The resinous bark of maritime and Aleppo pines is highly inflammable, and since neither tree reproduces from shoots, burning is usually fatal. Yet both species, especially the Aleppo pine, are pyrophytes. Indeed, the presence of a large number of pine seedlings is a sure indication of recent burning. Both species produce abundant seed, and proliferation is encouraged by the destruction of competitive growth. If fifteen or more years have elapsed since a fire, the seedlings reach maturity and the ground is again littered with seeds; but recovery is thwarted by more frequent fires.

Little is known of the effects of fire on the Moroccan fir, but it is probably unimportant as an agent of deforestation. The three main stands of fir grow on the highest slopes of limestone mountains, where there is little underbrush. Furthermore, these mountains do not have sufficient surface water to support permanent human settlement. Goats driven to the mountains from the lower slopes have destroyed many seedlings, but there is little evidence of destructive forest fires. Nor is there evidence of destructive fires in relatively undisturbed stands of cedar. Such forests have little underbrush to serve as kindling, and the cedar itself does not burn easily. But fires may be serious where cedar forests have been invaded by secondary growth. Most of the shrubs common in open stands of cedar—*Cistus, Daphne, Genista, Cystius, Thymus,* and *Halimium*—are highly inflammable. Occasional fires followed by long periods free of disturbance generally do not cause deforestation, but deforestation results when seedlings are destroyed before they can produce seed. The critical interval is disadvantageously long, for the Atlas cedar does not produce abundant seed until it is forty to fifty years old.

DESTRUCTION BY DOMESTIC ANIMALS

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311 It would be hard to overemphasize the destruction wrought by grazing and browsing. More than half a million sheep and over a million goats are maintained in this zone. These figures are impressive, but the striking fact is that so large a number of animals are maintained by sedentary farmers. No tribe in northern Morocco is nomadic, and only the Ulad Stut and Aith Bu Yihyi practice transhumance. The main types of pastoral disturbance are well described by Braun-Blanquet.[illegible] Heavy pasturing causes: (1) withdrawal of large quantities of plant matter, (2) mechanical damage to plants by grazing, browsing, and trampling, (3) selective destruction of desired plants, (4) introduction of nitrophilous communities, and (5) alteration of micorelief.

The few cattle and camels kept in northern Morocco probably are not important agents of deforestation. Both animals are used almost exclusively for draft purposes, and few villages can afford to maintain more than one team. Authorities disagree on whether sheep have been significant factors in the process of deforestation. Most of the sheep in northern Morocco are in the drier and warmer parts of the zone, i.e., Garet and the eastern Rif. Woody plants are too

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(113) Clarendon Press, 1929); and B. O. Coventry, "Denudation of the Punjab Hills," *Indian Forest Records,* 14 (1929), 49–78.

[illegible] Braun-Blanquet, *op cit.,* pp. 367–368, cited in note 31.

233 311 tough and massive to be adversely affected by grazing, but sheep can destroy shoots and seedlings, particularly those of the resinous trees.[61] The presence of monotonous formations of *Stipa tenacissima* in the lower Moulouya Valley and on the Algerian Hauts-Plateaux probably indicates overgrazing, for a history of excessive grazing may be inferred wherever hard tussock grasses have replaced more palatable growth.

Where goats are numerous, deforestation is accelerated, for no hillside is too steep to daunt this very agile creature, and few plants escape its voracious appetite (pl. 8, *a*).A In Arcila, goats scale the nearly vertical Portuguese walls, and in the Sous Valley they climb into *Argania* trees. Not content with the grazing of grass, goats tear it up by the roots. When woody browse is exhausted, the soil itself is grazed in an attempt to get at the seeds of grasses and other plants. It is not surprising that the goat should be described as an "ecologic dominant,"[62] and that many naturalists would like to see it become extinct, except in zoos.[63]

[372] The most serious deforestation occurs when heavy browsing follows burning. Premature browsing or grazing results in the destruction of seedlings before they can produce a new crop of seeds. The French forestry service has ruled that burned areas should be closed to pasture for at least six years. The recovery of cedar forests may be thwarted if excessive browsing takes place within twenty years.[64]

311 137 The best-known relict of the cedars of Lebanon, a stand of several hundred trees, is protected from vandalism by a church and from goats by a stone wall.[65] In open places in the Mamora forest, young cork oaks survive only within a protective cluster of palmetto. On the semiarid plains of northeastern Morocco, *Pistacia atlantica* rarely survives unless it is protected by a spiny hedge of zizyphus or sumac (*Rhus pentaphylla*), and in the Sous Valley the latter species plays an even more vital role as a protector of young *Argania* trees. In the mountains of northern Morocco, seedlings of cedar, pine, and fir are protected by the armature of the juniper. Elsewhere on the Mediterranean versant, young trees may be protected by *Genista, Calycotome, Ulex,* and other thorny Leguminosae.

311 233 372 137 Trees that reproduce by coppice shoots are seldom completely destroyed, but excessive browsing may reduce them to shrub form. In the geographic textbooks the scrub or dwarf state of the Mediterranean woodland is often described as a consequence of the Mediterranean precipitation regime. The error of this generalization is manifest in the holly oak. That the stunted and deformed appearance of this tree results from fire-induced sprouting and browsing is evident when stately trees growing on protected sites are compared with the prevalent forms. Neither climate nor any other element of the inanimate environment can explain

[TEXT CONTINUED ON PAGE 107]

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[61] Boudy, *op. cit.*, I, 616, is more emphatic: "Il est d'observation courante au Maroc, comme en Algérie, que dans tous les massifs de résineux où le parcours des moutons est intense, il n'y a pas de régénération et que ces massifs sont condamnés à disparaître à plus ou moins longue échéance."

[113] [62] Marston Bates, "Man as an Agent in the Spread of Organisms," in Thomas, *op. cit.*, p. 798, cited in note 7.

[113] [63] Raymond Furon, "The Gentle Little Goat: Arch Despoiler of the Earth," *The Unesco Courier*, January, 1958, pp. 30–32.

[64] Cf. Boudy's comment, *op. cit.*, II, 552: "Régénération de la cédraie et pâturage sont choses incompatibles." The prerequisites of recovery probably include at least three or four years of unusually heavy precipitation.

[113] [65] W. C. Lowdermilk, "Lessons from the Old World to the Americas in Land Use," *Smithsonian Inst. Ann. Rept. 1943* (Washington, D.C., 1944), p. 416.

A, [See p. 132--Analyst]

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2
Senhaja MX4

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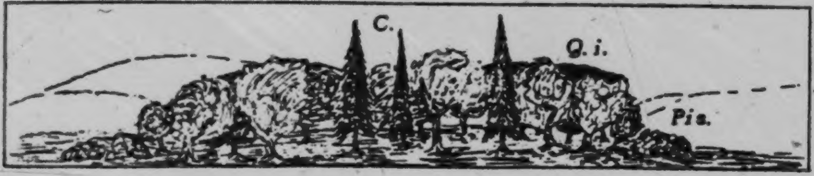

A. Sidi al-Hajj Yacub (Aith Seddath)

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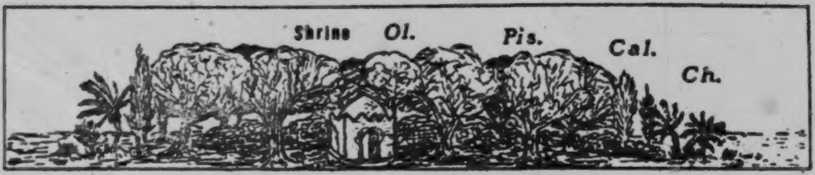
Shrine
Ol.
Pis.
Cal.
Ch.

B. Sidi Mahadri (near Tetuán)

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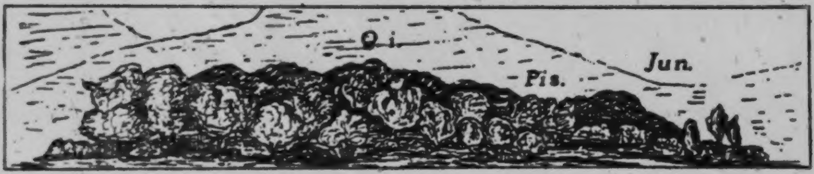

C. Km. 194, Tetuán-Melilla route

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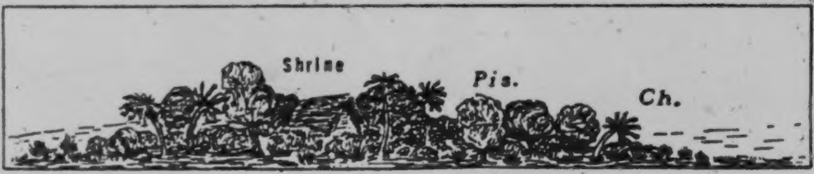
Shrine
Pis.
Ch.

D. Km. 55, Tangier-Larache route

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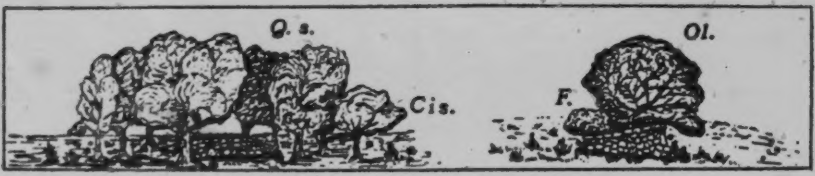

E. Bani Dercul **F. Sidi Loraichi (Bani Arus)**

Fig. 25. Profiles of vegetation on sacred sites.

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the stunted form of this tree. The same remarks apply to dwarf forms of thuya and oleaster. On protected sites even the palmetto may become a tree and, when disturbance is manifest, dwarf forms of cedar develop.

VEGETATION ON SACRED SITES

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Throughout Morocco and to some extent elsewhere in the Muslim world, cemeteries are regarded as sacred ground. Sanctity is ascribed also to the areas adjacent to tombs or shrines of saints (*murabitin*). The cult of saints has been an important factor in Moroccan history, and tombs or shrines are found in the territory of each tribe.[illegible]

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Sacred sites often constitute islands of verdure. This correlation is not unique. In *The Golden Bough* Sir James Frazer describes sacred woods in many parts of the world.[illegible] The interesting feature of the Moroccan situation is that such groves are extraordinarily numerous and that the veneration relates to the ground in which plants grow and not to the plants themselves.[illegible] Protected growth is usually more dense than the growth on adjacent profane land, and the height and girth of individual plants exceed those of plants growing on unprotected land. Some species (e.g., *Pistacia lentiscus* and *Chamaerops humilis*) rarely achieve arborescent forms on unprotected sites.

The nature of the protected growth varies from a single shrub or tree to thickets and groves. Figure 25 shows the silhouettes of vegetation on a few sacred sites. These examples, selected from hundreds, illustrate the general pattern (cf. pl. 9, *a* and *b*).A

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Figure 25, *a*, shows a few mature cedars surrounded by a dense growth of holly oak. The prevalent vegetation in this area is a shrub formation dominated by *Cistus laurifolius*. There are no other cedars within a radius of several hundred meters, and holly oaks, apart from those on sacred sites, are in scrub form. It is evident that succession has resulted in a retrogression from cedar to oak forest and then to a sparse cover of shrubs.

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Figure 25, *b*, illustrates a protected formation dominated by oleasters (cf. pl. 9, *a*). *Pistacia lentiscus* becomes prominent where oleasters are widely spaced and light reaches the ground freely. Palmetto and thuya, even more heliophilous, are confined to the edges of the protected growth. In the surrounding area the vegetation is limited to shrubs. Numerous other examples of oleaster groves fringed with pistacia and palmetto could be described. A handsome grove appears at the tomb of Sidi Manari on Cape Malabata opposite Tangier. Five groves appear on one ridge between Tangier and Tetuán. Others appear on the marine terraces between Tangier and Arcila, and on the lower slopes of the limestone mountains

[TEXT CONTINUED ON PAGE 110]

[illegible] E. Lévi-Provençal, "Marabout," in H. A. R. Gibb and J. H. Kramers, eds., *Shorter Encyclopaedia of Islam* (Leiden: E. J. Brill, 1953), pp. 325–326; Emile Dermenghem, *Le Culte des saints dans l'Islam maghrébin* (Paris: Gallimard, 1954); Edward Westermarck, *Ritual and Belief in Morocco* (London: Macmillan and Co., Ltd., 1926). R [113]

[illegible] Sir James Frazer, *The Magic Art and the Evolution of Kings* (New York: The Macmillan Co., 1935). Part I of *The Golden Bough*. R [113]

[illegible] J. Cola Alberich, *Cultos primitivos de Marruecos* (Madrid: Instituto de Estudios Africanos, 1954), refers to tree worship (*dendrolatría*), but the evidence he cites relates to popular ideas of the medicinal and magical qualities of plant material (leaves, seeds, acorns, etc.) and not to the sanctity of plants as such. It is possible, for example, to recognize magical qualities in pine cones and yet have no reluctance to destroy or mutilate pine trees. In Morocco the important consideration is not what qualities a plant may possess but *where* it grows. R [113]

A. [See p. 133--Analyst]

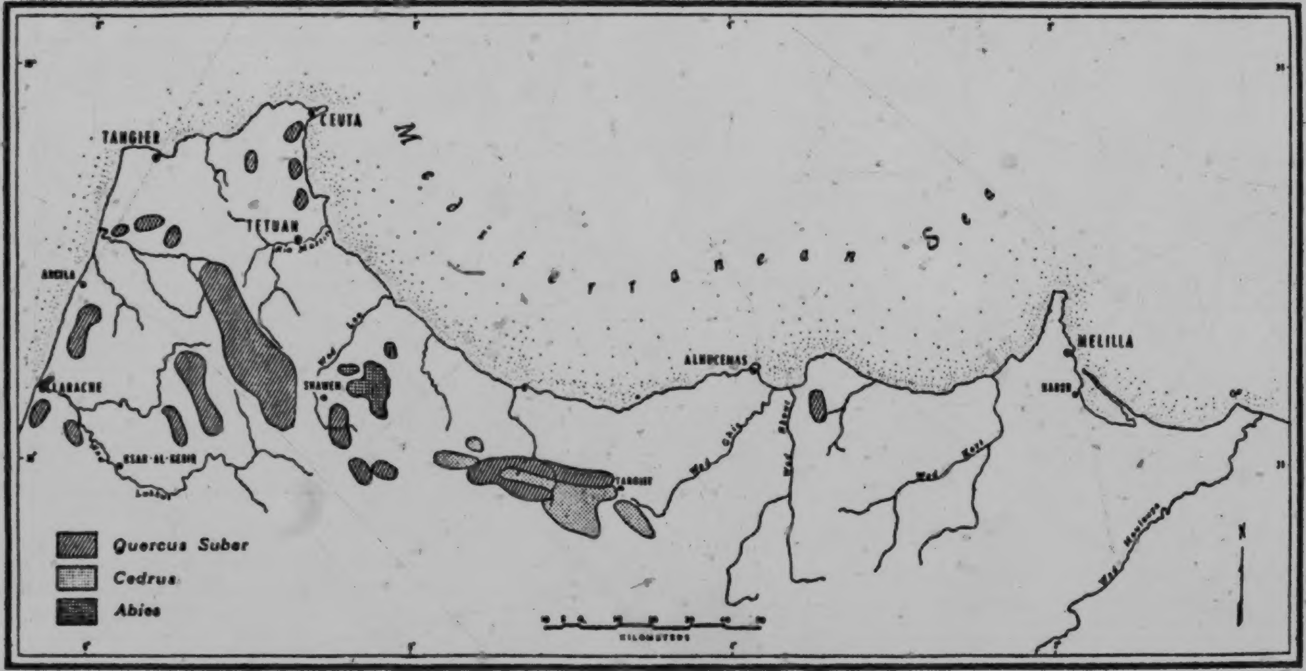
TANGIER
CEUTA
TETUAN
ARCILA
LARACHE
KSAR-AL-KEBIR
Lukkos
SHAUEN
TARGUIST
ALHUCEMAS
MELILLA
NADOR
Mediterranean Sea
Rio Martil
Wad Lau
Wad Ghis
Wad Nekor
Wad Kert
Wad Moulouya
N
KILOMETERS
▨ Quercus Suber
▒ Cedrus
▩ Abies

Fig. 26. Northern Morocco: present distribution of forest.

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

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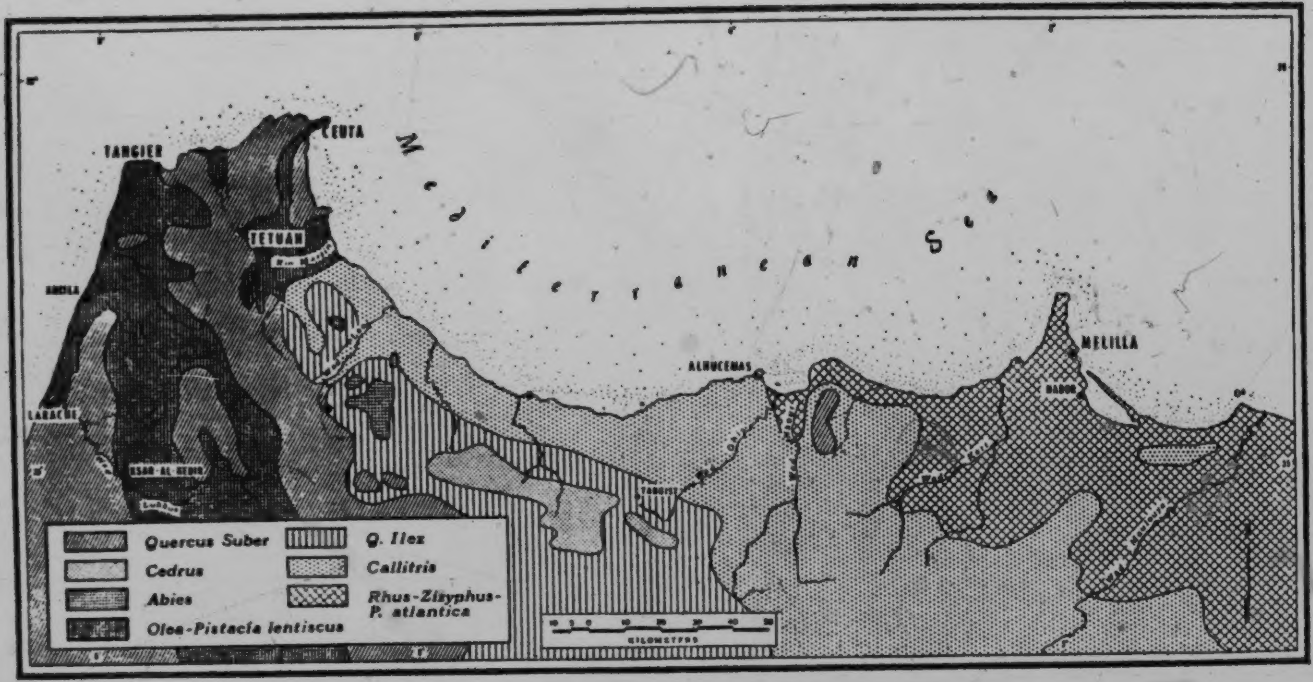
TANGIER
CEUTA
TETUAN
ARCILA
LARACHE
KSAR-AL-KEBIR
Mediterranean Sea
ALHUCEMAS
TARGIST
MELILLA
NADOR
Quercus Suber
Cedrus
Abies
Olea-Pistacia lentiscus
Q. Ilex
Callitris
Rhus-Zizyphus-P. atlantica
KILOMETERS

Fig. 27. Northern Morocco: inferred primordial distribution of forest.

J 778 137 311 south of Tetuán. There are at least a hundred oleaster groves in the area west of Ceuta and Ksar al-Kebir. In some areas oleasters mark every cemetery. Faced with this evidence, we can hardly avoid the inference that the primordial cover of the lowlands of northwestern Morocco was a woodland formation of oleaster and pistacia, and that the present cover of palmetto scrub represents degradation.

R [778] [137] [311] Figure 25, *c*, shows a protected stand of holly oak. The central part of the sacred grove consists of tall trees. *Pistacia lentiscus* and *Juniperus Oxycedrus* form a ring around the protected trees. Holly oaks are scattered throughout the central highlands (cf. fig. 8), but closed stands similar to the one depicted here are found only on sacred sites.

In figure 25, *d*, the evidence suggests, not a retrogression from forest species to scrub, but, rather, that two species which usually appear as shrubs, *Pistacia lentiscus* and *Chamaerops humilis*, may have an arborescent form. The density of the protected formation and the height of its components differ markedly from the scrub cover of the surrounding land.

000 The cluster of cork oaks shown in figure 25, *e*, is preserved in an area of extensive clearing. Most of the nearby land has been burned during the last decade. The only conspicuous plants are *Cistus monspeliensis* in fallow fields and *Nerium oleander* along stream channels. This cluster of trees gives some indication of the plant cover of the area before it was cleared, and indicates the course of regeneration (cf. pl. 9, *b*).

In figure 25, *f*, a shrine is marked by two plants, an oleaster and a fig tree. This sketch illustrates on a small scale what the others show in greater detail. Most of the area surrounding the shrine is cultivated. Fallow fields are covered with *Asphodelus microcarpus*, *Urginea maritima*, and palmetto. The nearest oleaster, seven kilometers away, also grows on a sacred site.

EXTENT OF DEFORESTATION

R 311 137 Trends in plant ecology, viewed in the light of human relationships, take one of two courses, improvement or deterioration. The evidence examined thus far clearly indicates deterioration. What is the magnitude of change? This question cannot be answered in detail. Change is perceived through comparison, and the only reliable source of plant data is the visible pattern of today. Figure 26 gives a synoptic view of the distribution of forest. Figure 27, the basis for comparison, shows inferred primordial or potential forests. The first map is objective; it is a cartographic record of the distribution of forest in the sixth decade of the twentieth century. The second map is subjective, and its usefulness is conditioned by the quality of the evidence presented thus far.

R 133 137 The details of these maps are less important than their general outlines. The implication is clear that the present wooded area constitutes only a small part of the primordial forest. Many forest species, now stunted and widely spaced, may once have been taller and more closely spaced. Under undisturbed conditions the exceptionally xerophytic or heliophilous species would probably be confined to sunny slopes in the western sector or be limited to the semiarid eastern plains. Under optimum conditions the area covered by pyrophytic shrubs would be greatly reduced, and there is no reason to believe that the primordial cover

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would have included a large proportion of thorny plants. The exceptionally mesophytic species, *Abies pinsapo, Cedrus atlantica,* and *Quercus pyrenaica,* would presumably be restricted to the mountains even if all destructive activity came to an end. But moderately xerophytic and heliophilous trees, the oleaster and the evergreen oak, would occupy larger territories. Under favorable conditions the Barbary thuya would probably be taller and more closely spaced, and the formation described as thorn scrub would be a xerophytic woodland, dominated by *Pistacia atlantica* and *Rhus pentaphylla.*

R 133 137 311

If cutting, browsing, and burning ceased, most of the area now covered with palmetto scrub would eventually be clothed with forests of oleaster, cork oak, and holly oak. The primordial ranges of oleaster and cork oak would be determined by edaphic and climatic factors. The cork oak, which cannot grow on calcareous soils, would occupy the Pliocene terraces of the Atlantic littoral, the sandstone outliers of the Rif chain, and the slopes of intermediate elevation in the schistose highlands. Some connection may have existed between the cork forests of the central highlands and the small stand of *Quercus Suber* in the mountains immediately east of Wad Nkour. A solitary cork oak grows on a sacred site near the summit of Adrar Gurugú (885 meters). Recent dunes on the Atlantic and Mediterranean coasts probably were once covered with *Juniperus phoenicea.** In heavy clay soils the cork oak would give way to *Olea europaea* and *Pistacia lentiscus,* which would cover the lower slopes of the limestone mountains also. The sacred groves west of Ceuta and Shawen exemplify the natural state of this formation.

At higher elevations in the limestone mountains the natural forest was probably dominated by holly oak. It is necessary to postulate such a forest even though there is little evidence of it today. The agents responsible for the destruction and mutilation of *Quercus Ilex* have already been described. As we have noted, this tree is tolerant of most soils and has the widest range of any Moroccan tree (fig. 7).

The natural province of the Moroccan fir would be about the same as its present range, above 1,500 meters in the limestone mountains. At present this genus is restricted to the mountains east and southeast of Shawen. The only other peak in the calcareous chain high enough to support fir forests is Jbil Kelti (1,927 meters). Destructive processes, especially browsing by goats, have reduced the density of the remaining stands, but it is not likely that fir forests covered any lowland area in historic time.

S 137 311 S [778]

Changes of greater magnitude appear to have taken place in the cedar forests. The lower limit of this tree overlaps the upper limit of cultivation (pl. 6, *a*). A Retreat is especially evident on the northern slope of Adrar Taghzut (fig. 28). At present the lower limit of the forest on this slope is at about 1,800 meters, but a single majestic cedar grows on the site of a shrine (Sidi Abd al-Grifar) in the bottom of a deep valley, 600 meters below the main stand. In the valley of Wad Ouergha, protected cedars are found at even lower elevations. In the

(TEXT CONTINUED ON PAGE 113)

R [113]

* The red juniper is still scattered over the dunes between Rabat and Larache, but has been replaced by herbaceous growth and the Aleppo pine on the Mediterranean coast. On dune vegetation, see J. Ruiz de la Torre, "La vegetación natural del norte de Marruecos," *Notes Marocaines,* 9–10 (1957), 23–33; and Louis Emberger, *Notice phytogéographique sur une partie de la meseta marocaine septentrionale* (Montpellier: Causse, Graille, and Castelnau, 1931).

A, [See p. 130--Analyst]

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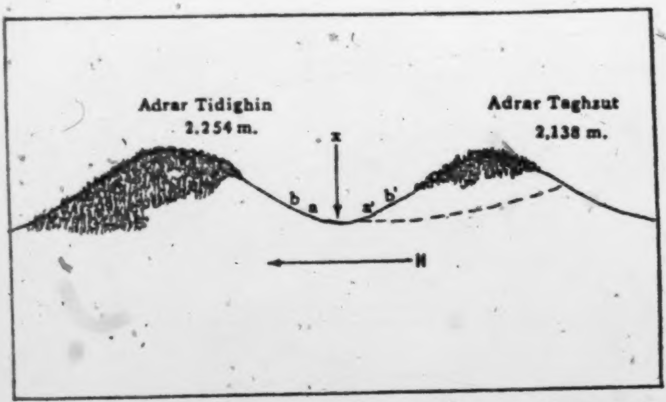
Adrar Tidighin
2.254 m.
Adrar Taghzut
2,138 m.
x
b
a
x'
b'
N

Fig. 28. Position of cedar forests in relation to land use on Adrar Tidighin and Adrar Taghzut: *a*, *a'*, zone of irrigated terraces; *b*, *b'*, zone of dry farming; *x*, location of protected cedar.

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311

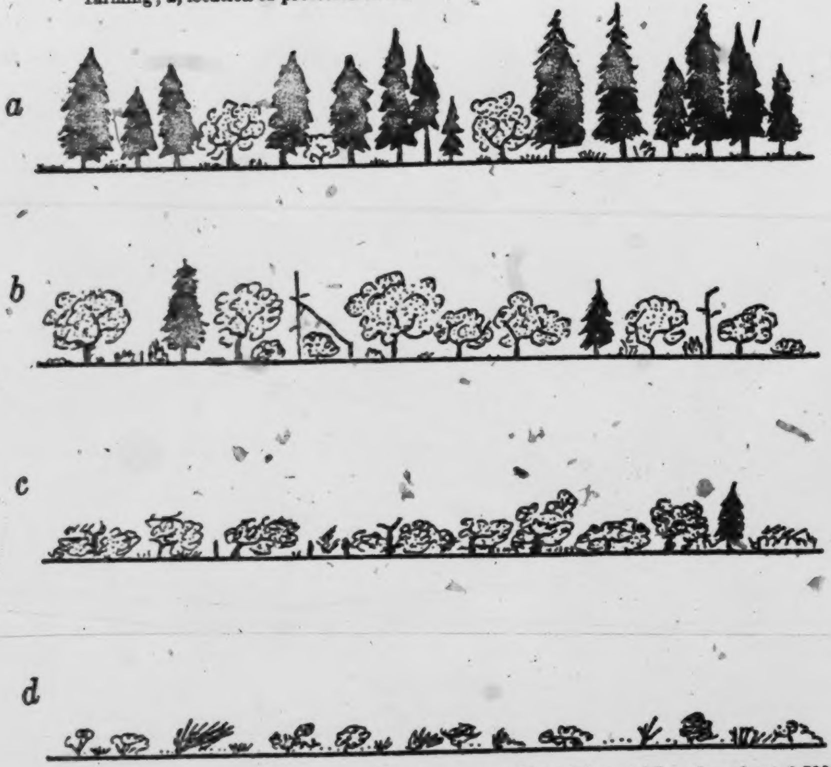

Fig. 29. Stages in retrogression of a cedar forest near Tiata Ktama (elevation about 1,500 meters): *a*, undisturbed forest; *b*, mixed stand of cedar and oak; *c*, secondary scrub oak formation; *d*, tertiary scrub formation without oak.

S 137 311 bottoms of valleys, low nocturnal temperatures, caused by air drainage, probably favor the cedar; nevertheless, on many slopes the forest line appears to be 300–500 meters above its natural position.

R 133 137 Cedar forests do not regenerate unless pasturing is suppressed and there is an opportune cycle of wet years. Moreover, the subsoil and parent material must be loose enough to favor the development of seedlings and yet compact enough to retain moisture. A further prerequisite is that there must not be a thick cover of competitive shrubs. A single deforestation may drastically upset the natural equilibrium; if disturbance continues, recovery may be impossible. The mantle of cedars on relatively inaccessible slopes gives some indication of the appearance of the primordial forest (pl. 10, *a*). Figure 29 shows the trend of retrogression. On gentle slopes, undisturbed stands are dense, dark, and relatively free of underbrush. Steeper slopes, exposed to greater insolation, have an understory of shrubs and oaks. Burning or cutting followed by pasturing eliminates the cedar and reduces the oaks to scrub form. If disturbance continues, the plant cover degenerates to a sparse scrub of *Genista quadriflora, Juniperus Oxycedrus,* and *Cistus laurifolius.*

J 133 137 It is difficult to delimit the primordial pattern of the cedar forests. Forests probably existed on Jbil Kelti (1,927 meters), Jbil Sugna (1,600 meters), and Jbil Buhashim (1,681 meters), for a few cedars still grow on these peaks. The absence of cedars from Jbil Khsana (1,695 meters) is puzzling, since this peak receives abundant precipitation, and is composed of sandstone and schist, which R 133 137 weather into deep soils. At present no cedars appear east of Adrar Tizi Ifri, but they may once have clothed the highest peaks of the eastern Rif, including Adrar Hamam (1,930 meters) and Azru Akchar (2,011 meters). It cannot be proved that the cedar once grew beyond its present range, but the pattern of succession suggests that some stands may have been completely destroyed.*

R 137 311 The theory was presented in chapter ii, that both the Aleppo and the maritime pine may be relicts which have been encouraged to advance by the destruction of competitive growth. If this notion is sound, the area originally covered with pines must have been even smaller than the present stands. This interpretation helps to explain the presence of pines in degraded forests of cedar and fir. However, human interference has probably caused a reduction of some stands of Aleppo pine, particularly on the Melilla peninsula and in the mountains southeast of Shawen. Disturbance might initially have encouraged expansion and then forced a new retreat. It is difficult to enlarge on this idea, for the existing stands of pine are too small and widely scattered to be placed accurately on the maps.

Prolonged disturbance and exploitation of the Barbary thuya have diminished the density of the remaining stands and reduced many trees to shrub form. The natural range of thuya in the western half of the zone can be traced without much difficulty. At higher altitudes on the Mediterranean versant, increased precipitation and lower winter temperatures favor cork oak and holly oak. On the Atlantic versant, climatic factors alone delimit the range. It is more difficult to trace a

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R [113] * Louis Emberger, *Aperçu général sur la végétation du Maroc* (Bern: Hans Huber, 1939), (ref. to map), seems to regard the primordial range of the cedar as essentially the same as the present range. Ruiz de la Torre, *El matorral en Yebala,* pp. 22–23, cited in note 41, suggests a natural extension to include the highest peaks of Ghmara and Jbala.

A, [See p. 134--Analyst]

137 311 limit in the area east of Wad Nkour. Emberger believes that most of the eastern lowlands were once covered with thuya. According to another study, undertaken by an engineer of the Spanish forestry service, the natural range of the thuya extended to all areas of residual soil from the Nkour Valley to Wad Moulouya. [114] These interpretations may be sound, but the evidence presented here suggests that the primordial cover of most of the eastern sector was a mixed formation of *Pistacia atlantica* and *Rhus pentaphylla* with scattered clumps of oleaster. The effect of prolonged disturbance has been to reduce the area covered by these species and to favor the expansion of alfa grass (*Stipa tenacissima*), dwarf sage (*Artemisia Herba alba*), and camel thorn (*Zizyphus lotus*).

There has been no study of plant succession in the arid and semiarid parts of northern Africa comparable in scope to Aubréville's monumental treatise on the effects of burning, clearing, and pasturing in tropical Africa. Deterioration of ranges and "xerophytism" have been reported for most of the pre-Saharan zone, but it is not yet possible to determine the extent of change. The American statesman-scholar George P. Marsh argued long ago "that forests would soon cover many parts of the Arabian and African deserts, if man and domestic animals, especially the goat and camel, were banished from them." In recent years a number of French scholars have expressed doubts concerning the theory that the vast formations of alfa grass and dwarf sage on the Algerian plateaus developed as a result of the semiarid climate. After careful study of scattered stands of *Acacia gummifera* on the arid littoral of Morocco, south of Agadir, Charles Sauvage questions whether the zone between Anti Atlas and Wad Dra should be described as asylvatic. Basing his conclusions on the wide occurrence of acacias in the desert, one author speaks of the primordial forests of the Sahara. Sixty years ago another naturalist discovered that many of the wadis in the Egyptian desert were named after trees that had since disappeared. Thus we have evidence that the effects of human disturbance have been felt even in the Sahara, and that aridity does not prevent the growth of some trees.

778 137 311 In the semiarid sector of northern Morocco it is possible to reconstruct vegetational changes with the aid of relict formations preserved on sacred sites. At the shrine of Sidi Seddic, on the border of the territories of Ulad Stut and Aith Bu Yihyi, a majestic oleaster, surrounded by sumac, is in striking contrast to the prevalent cover of dwarf sage. *Pistacia atlantica,* one of the few trees of northern Africa that can grow on heavy alluvial soils, appears on several sacred sites in

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137 311 113

Emberger, *Aperçu général sur la végétation du Maroc*, pp. 71–78.

J. Ruiz de la Torre, "La vegetación natural del norte de Marruecos," *Notes Marocaines*, 9–10 (1957), 30–33.

André Aubréville, *Climats, forêts et désertification de l'Afrique tropicale* (Paris: Editions Maritimes et Coloniales, 1949).

George P. Marsh, *The Earth as Modified by Human Action: A Last Edition of "Man and Nature"* (New York: Scribner's Sons, 1885), p. 149.

According to Emberger, *Aperçu général sur la végétation du Maroc*, p. 68, "Les prairies d'halfa peuvent représenter d'anciennes forêts de *Juniperus phoenicia*, parfois même de *Callitris* et même de *Quercus Ilex*." Buffault, "Le déboisement de l'Afrique du Nord," p. 481, cited in note 15, also accepts the notion of a primordial forest on the Hauts-Plateaux.

Ch. Sauvage, "Les environs de Goulimine: carrefour botanique," in *Volume jubilaire de la Société des Sciences Naturelles du Maroc* (Rabat, 1948), pp. 107–146.

L. Lavauden, "Les forêts du Sahara," *Rev. des Eaux et Forêts*, 65 (1927), 265–277.

E. A. Floyer, "Disappearance of Desert Plants in Egypt," *Kew Bull. Miscell. Information*, 72 (1892).

137 the valleys of Wad Moulouya and Wad Kert.[*] The Aleppo pines preserved on
311 the Melilla peninsula tell a similar story of general destruction and rare survival.
[778] Elderly tribesmen of Ibdharsen, Aith Bu Yihyi, and Ulad Stut remember a time
when great thickets of sumac covered the plains of Garet.

The evidence examined in this chapter supports the thesis, now accepted by most students of Mediterranean vegetation, that the prevalent maqui and garrigue formations are produced and maintained by man. The pattern of succession in the drier eastern sector of northern Morocco depends upon ecologic processes that are not yet thoroughly understood. The theory that this area was once wooded may or may not be sound, but there is no reason to believe that the primordial cover included a high proportion of tussock grass, zizyphus, or other animal-resistant plants. Any projection of current trends, whether in the drier or the wetter areas, suggests a large degree of change. This introduces new problems, for the inevitable result of biotic disturbance is a modification of the soil.

EROSION

134 The steep slopes of northern Morocco favor rapid runoff and prevent the formation of deep residual soils. Moreover, torrential rains in winter and spring follow vigorous mechanical weathering during the dry summer months. It would be hard to imagine an area more vulnerable to destructive erosion. Few slopes have an adequate plant cover, and forest now covers only about a tenth of its primordial range. In view of these natural and artificial conditions, it is not surprising that soil forms a deep and continuous mantle only in the coastal plains, and that most of the highlands are bare.

A useful point of departure is to locate areas that are virtually without soil. This is the situation in the calcareous highlands. From Jbil Musa to Ibuqquyen the horizon is dominated by a wall of bare limestone. It is possible that soil never was formed on the steepest slopes. On moderate slopes there are small and discontinuous patches of clay, but most of the calcareous zone has been stripped of fine material and only cobbles remain. Here and there are tiny mounds of soil preserved by the roots of a palmetto (pl. 11, *b*). On some slopes, particularly in the range of Jbil Kelti, lines of stone have been built up when there was enough soil to justify clearing and cultivation.

The rate of erosion in any storm depends on the force with which raindrops
stir up the soil and the amount and speed of the runoff. Deforestation, particu-
[311] larly on steep slopes, accelerates degradation, and the combination of cutting,
burning, and browsing prevents any reëstablishment of protective cover. Although
the calcareous highlands were probably once covered with forests of holly oak
(cf. figs. 5 and 27), today, vast areas lack even herbaceous growth. In the karstic
[137] highlands the only conspicuous plants are palmetto and spiny gorse (*Ulex parviflorus*).

Erosion is not quite so serious in the highland areas formed of schist and sandstone. Protected stands of cedar, cork, and deciduous oaks are associated with abundant litter and about eighteen inches of clay or sandy loam. But in cleared
[311] areas there is abundant evidence of loss of topsoil (pl. 10, *b*). Since it is common

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[113] [*] *Pistacia atlantica* has been used to stabilize slopes in Israel. G. F. Gindel, "Afforestation of the Semi-arid and Arid Areas in Palestine," *Empire Forestry Rev.*, 25 (1946), 213–221.

R 134 311 [312] practice to allow sheep to graze on stubble, many slopes are completely bare when the first rains fall. Erosion is retarded during spring and summer when a part of the runoff is diverted into irrigation ditches, but the irrigation systems promptly disintegrate at the beginning of the rainy season, and runoff again follows the network of gullies (pl. 11, *a*).

R 133 134 Gullying is most severe in the hilly areas of the Rif. The basins of Wad Ghis, Wad Nkour, and Wad Kert show an intricate pattern of short, steep slopes. "Ghis" means "mud" in Arabic, and most of the mud comes from the denuded highlands. The lower course of each river is joined by deeply entrenched tributary streams cutting through old fans and terraces. In Targist, Thimsaman, and Tafarsith the best farms are on fragments of Pliocene conglomerate, isolated from one another by deep ravines. R 133 134 241 311 Badland topography covers most of the area between Wad Nkour and Wad Kert. This may be described as an erosion-induced hoe-culture, for slopes are so badly dissected that it is no longer possible to use plows. The desperate effort to produce grain is abandoned only when the harvest does not repay the investment in seed. Cereals are sown in gullies and on nearly vertical slopes. The Spanish learned to their dismay that hungry Rifians try to cultivate even the roadbeds. The plains of Garet and the lower Kert constitute islands of alluvium in a sea of denuded terrain. Serious erosion becomes evident as soon as one passes to older terrace and residual soils. The hills of Ikibdhanen and the volcanic eminence of Gurugú are as bare as the limestone peaks.

J R 133 134 The pattern of gullies and rills continues into the hills of Jbala and Ghmara, but the most serious problem in these areas is sliding. The roads from Tetuán to Tangier and Shawen are blocked by slides every year. In Anjra and Fahs one is never out of sight of a slide scar. Gullying is less serious than in the eastern sector, but streams are slightly entrenched even in the rolling country south of Tangier, and the marine terraces between Arcila and Larache are cut by deep barrancas.[illegible]

R [213] [illegible] René Raynal, "Bodenerosion in Marokko," *Wissenschaftliche Zeitschrift der Martin-Luther-Universität Halle-Wittenberg*, 5 (1956–1957), 885–894.

CHAPTER VIII

SUMMARY

105 FROM the standpoint of the cultural geographer, northern Morocco is perhaps best described as an area of modified Berber culture located within the realms of Mediterranean environment and Islamic civilization. The influence of the Mediterranean environment is most clearly seen in modes of livelihood, while Islamic influence predominates in religion, language, and social organization. The persistence of traits of truly indigenous (i.e., Berber) culture is explained in large part by the lack of direct communication with the Muslim heartland and the main centers of Western civilization. Berber traits have persisted also because of environmental conditions and social circumstances that discouraged economic development and political centralization. The cultural geography of northern Morocco is best studied in the light of contingencies that are peculiar to this corner of the Old World.

The dominant physical feature of the area is the Rif mountain chain, which marks the division between a zone of effective isolation and one of peripheral passageways. The diffusion of most innovations can be traced along a hook-shaped course with the point embedded in the Ghmaran hills. The main stream of Moroccan history flows through the Taza corridor and then north or south along the Atlantic littoral. The Moulouya Valley has never been more than a minor distributary. It was followed by bedawin during the final phase of the Arab invasions, but the semiarid plains of northeastern Morocco did not attract immigrants seeking opportunities for a settled life. In contrast, the Taza corridor leads to lands of reliable rainfall and fertile soil.

The first and most important breach of the mountain rampart occurred along the ridges leading from Shawen to Targist. It was along this route that Islam and Arabic advanced most rapidly into the highlands. The same route served the Spaniards as the sole link between the western and eastern parts of their protectorate. Invaders found it easy to move along the Atlantic littoral, and a few managed to penetrate the Jbalan hills, but no major force moved into the highlands from the east or south. It is not yet certain whether the famous "Unity Road" (Tariq at-Tauhid), built immediately after independence to link Alhucemas and Fez, will prove worthy of its name.

From 1912 until 1928 the area of effective Spanish occupation was about the same as the area occupied by the Romans. The extent of the *bilad al-makhzen* fluctuated from reign to reign; yet even the more ambitious sultans were not able to exercise enduring influence in the Rif. Roman Morocco was a land of plains. The Arabs managed to add a large area of foothills. After numerous setbacks the Europeans were able to subdue the highlands. The present government, profiting from the accomplishments of the protectorates, has tried to unify the Moroccan people and integrate the national economy. It is no longer reasonable to describe Morocco as a primitive country rent by the hostility of Arabs and Berbers or townsmen and tribesmen. The conquest of the lands of dissidence has eliminated or at least masked the major dichotomies. Nevertheless, one is still tempted to speak of Moroccos rather than a Morocco.

105 Many of the basic distinctions in the cultural geography of northern Morocco can be attributed to two main factors: the sense of collective identity that is felt by members of tribal confederations and some individual tribes, and the extent to which such groups have been exposed to alien influence. For example, Berber speech in the Rif has survived because it is an expression of fraternal unity, and because the traditions of political independence and economic self-sufficiency have enforced the isolation of the area from the main centers of Arab influence.
[186] Moreover, the preservation of Berber speech and many other aspects of Berber culture have been encouraged by the contempt of the Rifians for their Arab or
[176] [178] Arabized neighbors. In the Rif, as elsewhere, an innovation may be accepted or rejected, not on the basis of its form and content or its compatibility with established custom but because of its affiliation with desirable or undesirable groups.

Consciously or unconsciously, tribal groups have selected material traits, such as distinctive clothing, settlement patterns, and types of houses, to serve as symbols of their identity. It is not by accident that the western limits of dispersed settlement and flat-roofed houses nearly coincide with the western limits of Rifian speech. Nor is it surprising that symbols of tribal identity are more conspicuous in the highlands than on the Atlantic littoral. This contrast is explained, or at least clarified, when the distribution of culture traits is compared with the physical division between refuge areas and passageways.

Other notable examples of refuge areas are found on the Ghmaran coast, especially the territory of the Bani Bu Zra, and in the less accessible parts of Sanhaja as-Srair. The most exposed areas of northern Morocco are the Fahs territory, south of Tangier, and the basin of Wad Lukkus. These territories are cultural melting pots in which heterogenous elements have been blended by the pervasive force of Islam. Moreover, these territories, unlike the rest of the northern zone, have been affected by social and economic influences emanating from towns.

For northern Morocco as a whole, subsistence farming is clearly the predominant mode of livelihood. With the exception of hemp, grown in the Sanhajan highlands, there is no large cash crop. At most markets barter is more important than cash transactions, and the essential imports from the urban centers are limited to sugar, salt, tea, and kerosene. Yet the rural economy of northern Morocco should not be described as one of simple subsistence with little or no specialization or exchange. In northern Morocco, as in many other areas of the non-Western world, self-sufficiency at the scale of the canton or tribe reflects the specialized or semispecialized production of individual hamlets and farmsteads.

The basic differences within the agricultural framework depend upon the opportunities for cultivation of crops to supplement the staple cereals. Maximum opportunity is found in the Sanhajan highlands, where perennial streams provide water for irrigation of vegetables and legumes. There are few perennial streams in the western lowlands, but the combination of gentle slopes, fertile soils, and dependable rains minimizes the risks of dry farming and makes possible a surplus yield of grain to be drawn upon during unproductive months. In the Rif, horticulture provides a safeguard against failure of the cereal crops, and when bread is scarce, raisins, nuts, and figs are staple foods. The number of orchards decreases

105 toward the eastern plains, and the tribesmen of Garet and Gal'aya stake their lives on the unpredictable rains. The seasonal emigration from these districts results from the serious imbalance between population and reliable food supply.

In northern Morocco, as elsewhere in the Mediterranean region, the natural vegetation has been substantially modified. The principal causes of disturbance have been cutting, burning, and browsing, which have changed northern Morocco from a land of forests to a land of scrub. Large areas now covered with palmetto or thorn scrub once supported forests of oleaster, oak, cedar, and thuya. At present the distribution of forests is approximately the obverse of the distribution of men and livestock. Most of the remaining cedar forests are located above the limits of cultivation, and the surviving stands of holly oak occur in karstic highlands rising above cultivated plains. In the western lowlands most of the native plant cover has been destroyed. Sacred groves of oleaster give some indication of primordial or potential conditions, but only palmetto and a few other shrubs of the secondary growth survive. The record of succession is more complete in the Jbalan hills, and all stages in the retrogression are present in the Sanhajan highlands. The natural vegetation of the eastern plains, like that of the Atlantic littoral, has been almost completely destroyed, but the repeated expansion and contraction of the area of cultivated land permits an extensive development of secondary scrub.

The processes that have produced these changes can be traced into prehistory. Cereals were cultivated and goats were raised before the Phoenicians arrived. Since clearing is, and probably was, accomplished by burning, the limitations of Stone Age technology probably did not inhibit some modifications of vegetation and soil. It is hazardous to generalize about variations in the intensity of disturbance, for there is no way to determine long-term trends in the growth of human and animal populations. Nevertheless, some parts of the historical record are sufficiently striking to command attention—for example, the indication that shipbuilding was once an important industry on the Mediterranean coast, and that gates of cedar used to stand in city walls.

121 105 Understanding in cultural geography is attained through analysis of processes initiated and carried forward by man. In this work an attempt has been made to account for the distribution of culture traits and the effects of man's activities on the land. In other words, this study has been concerned with patterns and imprints of culture. The evidence examined suggests that the landscape of northern Morocco has long been affected by two trends: a blurring of cultural patterns, and a deepening and extension of cultural imprints. It is reasonable to suppose that both trends will persist. Political centralization will encourage acculturation, and further increase in population will accelerate modification of the land.

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7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

APPENDIX

VARIANT SPELLINGS OF PLACE AND LINEAGE NAMES

104 The first rendition of the following names is that of the present work. Subsequent renditions indicate variant spellings found on French (Fr.) and Spanish (Sp.) maps.

CITIES AND TOWNS

Arcila (Fr. Arzila)
Bab Barrad (Fr. Bab Berret; Sp. Bab Barret)
Dar Chaui (Fr. Dar Chaoui)
Fez (Fr. Fès)
Ishshawen. *See* Shawen
Izagan (Fr. Issagene; Sp. Isagan)
Ksar al-Kebir (Fr. Ksar el-Kebir; Sp. Alcazarquivir)
Segangan (Fr. Segangane)
Shawen (Fr. Chauen, Chechaouene; Sp. Chauen, Xauen)
Tabarrant (Fr. Taberrant)
Tangier (Fr. Tanger; Sp. Tanger)
Targist (Fr. Targuist; Sp. Targuist)
Tetuán (Fr. Tétouan, Tétouane)
Tistutin (Fr. Tistoutine)
Wezzan (Fr. Ouezzane)
Zeluán (Fr. Selouane)

DISTRICTS

Gharb (Fr. Rharb)
Ghmara (Fr. Ghomara, Rhomara; Sp. Gomara)
Jbala (Fr. Jebala; Sp. Yebala)
Sanhaja as-Srair (Fr. Senhaja es-Srair; Sp. Senhaya es-Serair)
Sanhaja Ghaddu (Fr. Senhaja Rheddou)
Sanhaja Musbah (Fr. Senhaja Mosbah)

TRIBES

Aith (Fr. Ait; Sp. Ait)
Aith Ammarth (Fr. Ammart; Sp. Ammart)
Aith Bashir (Fr. Becher; Sp. Bechir)
Aith Bu Gafar (Fr. Bou Gafar; Sp. Bugafar)
Aith Bu Ifrur (Fr. Bou Ifrour; Sp. Buifrur)
Aith Bu Nsar (Fr. Bou Nsar; Sp. Buensar)
Aith Bu Yihyi (Fr. Bou Yahi; Sp. Buiahi)
Aith Iznasen (Fr. Snassene; Sp. Snassen)
Aith Khannus (Fr. Khenhous; Sp. Jennus)
Aith Mazduwi (Fr. Mesdoui; Sp. Mesdui)
Aith Seddath (Fr. Seddat; Sp. Seddat)
Aith Shikar (Fr. Sicar; Sp. Chicar)
Aith Sidar (Fr. Sidel; Sp. Sidel)
Aith Tuzin (Fr. Tousine)
Aith Warishik (Fr. Oulichek; Sp. Ulichec)
Aith Wariyaghar (Fr. Ouriaguel; Sp. Urriaguel)
Anjra (Fr. Anjera; Sp. Anyera)
Bani (Fr. Beni, Bni; Sp. Beni)
Bani Bu Frah (Fr. Bou Frah; Sp. Bufrah)
Bani Bu Shibat (Fr. Bou Chibet; Sp. Buchibet)
Bani Bu Zra (Fr. Bouchera; Sp. Busera)
Bani Gmil (Sp. Guemil)
Bani Grir (Fr. Guerir; Sp. Guerir)
Bani Gurfat (Fr. Gorfet; Sp. Gorfet)
Bani Hassan (Fr. Hassane; Sp. Hasan)
Bani Hmid (Fr. Ahmed; Sp. Iahamed)
Bani Huzmar (Fr. Hozmar; Sp. Hosmar)
Bani Khalid (Fr. Khaled; Sp. Jaled)
Bani Mansur (Fr. Mansour; Sp. Mansor)
Bani Musawwar (Fr. Mezaouar; Sp. Mesauar)
Bani Rzin (Fr. Erzine; Sp. Ersin)
Bani Silman (Fr. Selmane; Sp. Selman)
Bani Siyyat (Fr. Ziat; Sp. Siat)
Bani Smih (Fr. Esmih; Sp. Esmih)
Bani Yidar (Fr. Ider; Sp. Ider)
Bani Yisif (Fr. Issef; Sp. Issef)
Bani Yittuft (Fr. Iteft; Sp. Itteft)
Bani Zakkar (Fr. Skar; Sp. Scar)
Bani Zejal (Fr. Esjjel; Sp. Seyyel)
Bdawa (Fr. Bedaua; Sp. Bedaua)
Ghzawa (Fr. Rhezaoua; Sp. Guezaua)
Hauz (Fr. Haouz; Sp. Haus)
Ibdharsen (Fr. Metalsa; Sp. Metalza)
Ibuqquyen (Fr. Bokoia; Sp. Bokoia, Bocoia)
Igzinnayen (Fr. Gzennaia; Sp. Gueznaia)
Ikibdhanen (Fr. Kebdana; Sp. Quebdana)
Imazujen (Fr. Mazouza; Sp. Masucha)
Jbil Habib (Fr. Jebel Hebib; Sp. Yebel Habib)
Khlut (Fr. Khlott; Sp. Jolot)
Khmas (Fr. Akhmas; Sp. Ajmas)
Ktama (Fr. Ketama; Sp. Quetama)
Mistasa (Fr. Mestasa; Sp. Mestasa)

TRIBES—*Continued*

104 Mtiwa (Fr. Metioua; Sp. Metiua)
Mzura (Fr. Mzora; Sp. Mzora)
Sahil (Fr. Sahel; Sp. Sahel)
Sumata (Fr. Soumata)
Tafarsith (Fr. Tafersit; Sp. Tafersit)
Taghzut (Fr. Tarhzout; Sp. Tagzut)
Thimsaman (Fr. Temsamane; Sp. Tensamen)
Ulad Stut (Fr. Oulad Setout; Sp. Ulad Settut)
Wadras (Fr. Ouedras; Sp. Uadras)
Zarqat (Fr. Sarkat; Sp. Sarcat)

MOUNTAINS AND STREAMS

Adrar (Sp. Aderar)
Adrar Dahdoh (Fr. Dahdeuh; Sp. Dehdoh)
Adrar Hamam (Fr. Hammane; Sp. Hammam)
Adrar Taghzut (Fr. Tarhzout; Sp. Tagzut)
Adrar Tidighin (Fr. Tidirhine; Sp. Tidiguin)
Jbil (Fr. Djebel, Jbel, Jebel; Sp. Yebel)
Jbil Alam (Sp. Aalam)
Jbil Buhashim (Fr. Bou Hachem; Sp. Buhachem)
Jbil Kelti (Sp. Quelti)
Jbil Khsana (Fr. Khesana; Sp. Jesana)
Jbil Leshab (Fr. Lechab)
Jbil Musa (Fr. Mousa)
Jbil Sugna (Fr. Sougna; Sp. Suna)
Jbil Tisuka (Fr. Tisouka; Sp. Tisuca)
Jbil Tisiran (Fr. Tisirene; Sp. Tisiran)
Kar-Kar (Fr. Kerker; Sp. Ker-Ker, Quer-Quer)
Wad (Fr. Oued; Sp. Uad)
Wad Ghis (Fr. Rhis; Sp. Guis)
Wad Kert (Sp. Quert)
Wad Lao (Sp. Lau)
Wad Martil (Sp. Río Martín)
Wad Moulouya (Sp. Muluya)
Wad Nkour (Fr. Nekour; Sp. Necor)
Wad Ouergha (Fr. Ouerrha; Sp. Uarga)

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PLATES

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7: Mikesell   K-4,5   (1955-1957) 1961   MX3 Rif
Jebala MX2
Senhaja MX4

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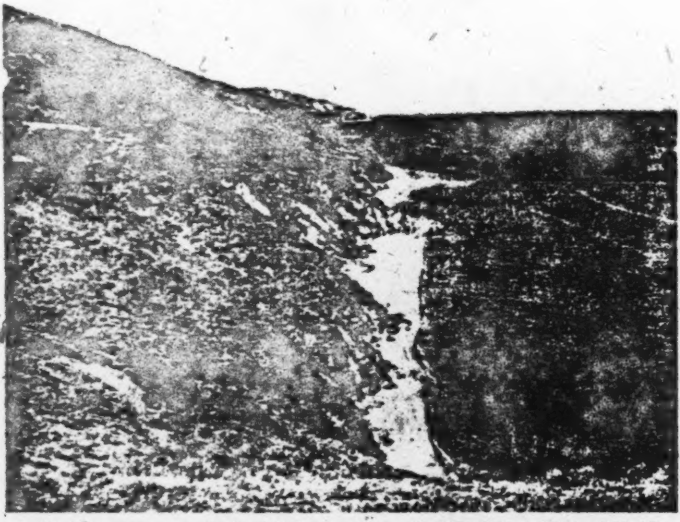

a. Mediterranean coast about 15 km. northwest of Wad Lao. Cliffs of highly resistant Paleozoic rock.

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b. Cedars near summit of Adrar Tidighin (2,456 meters).

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2

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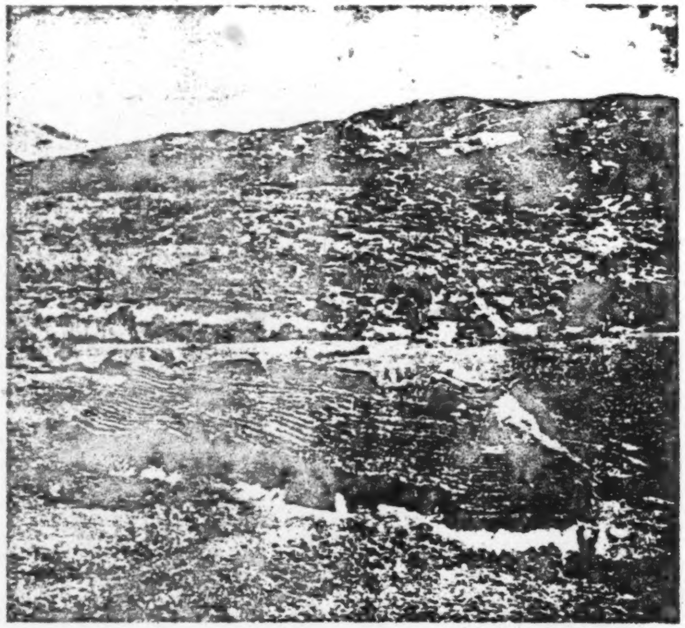

a. Composite dwelling in L-Khmas (Jbala), housing four families with seven units joined to form an enclosure.

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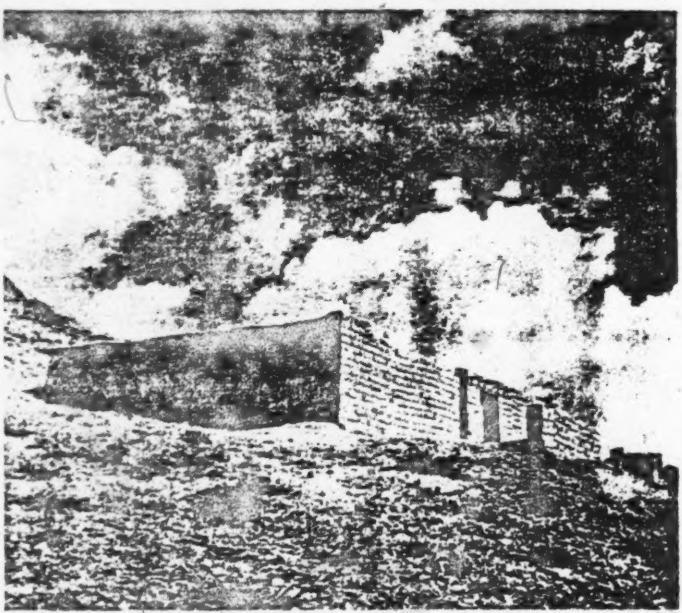

b. Flat house of Rifian type at Midar (Aith Tuzin). The walls of adobe brick are being covered with mud.

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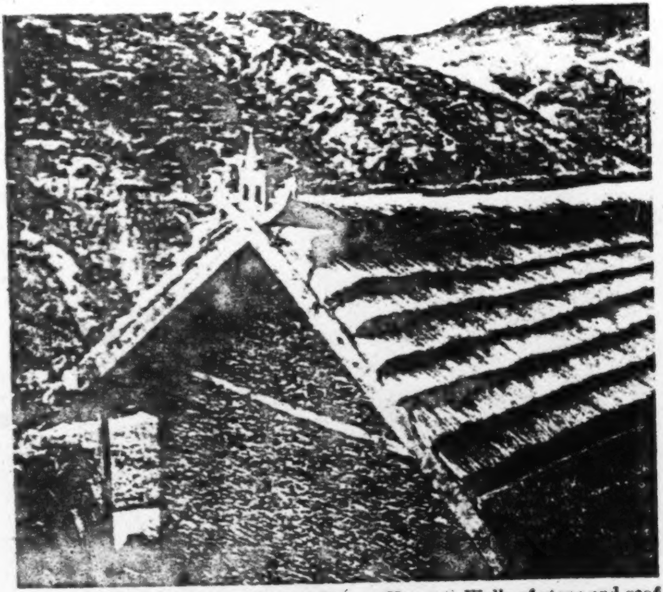

a. A house in the valley of Abd al-Ghaya (Ktama). Walls of stone and roof of rye thatch. Ornamental figure represents crescent moon, a symbol of good luck; brazier and teapot are symbols of hospitality.

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b. A typical two-story house in Ktama, with overhanging roof and projecting rafters. Lower floor serves as living quarters, upper for storage.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2

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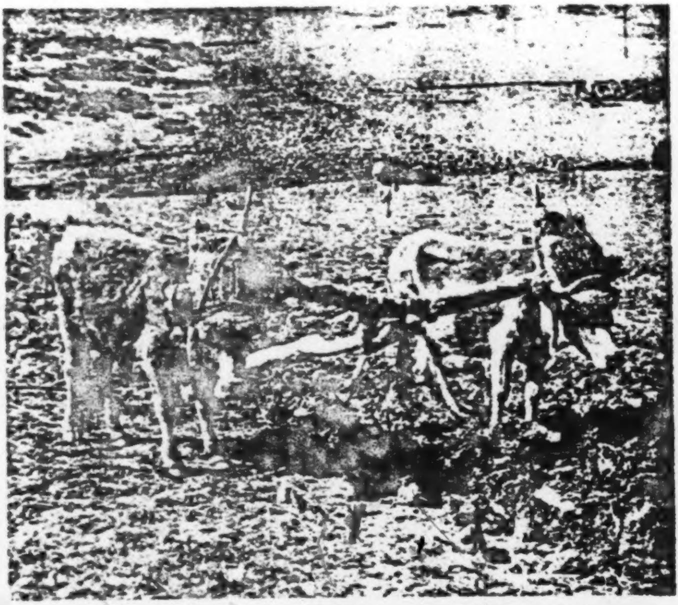

a. Plow of Jbalan type with high yoke set on foreheads of oxen.

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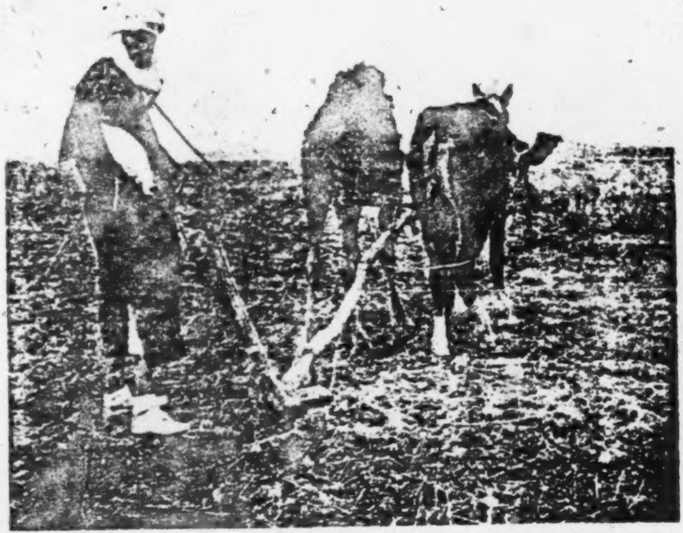

b. Mixed team in Garet.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Senhaja MX4

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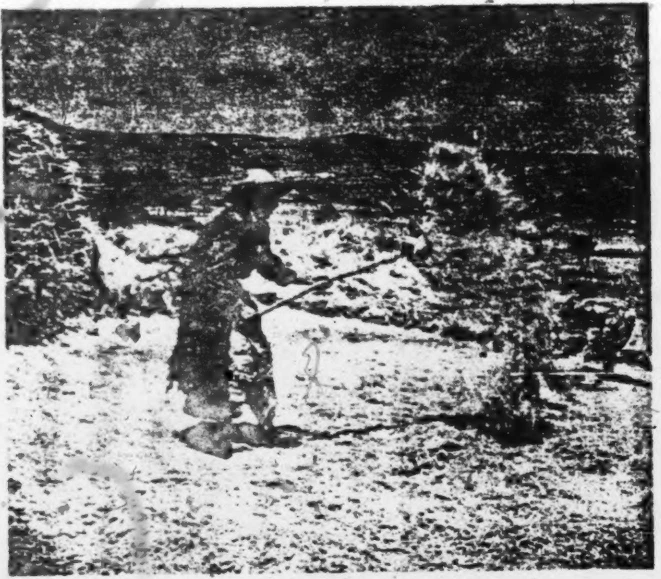

a. Winnowing barley at Targist.

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b. Irrigation ditch near Tlata Ktama.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif
Senhaja MX4

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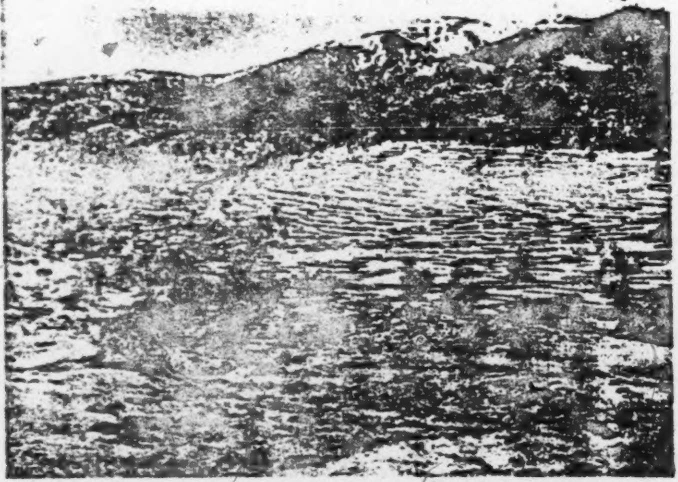

a. Agricultural terraces on north slope of Adrar Tidighin. Walnut and fig trees in cultivated area; remnants of cedar forest on higher slopes.

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b. Close view of terraced area shown above. The terraces were constructed to facilitate irrigation of maize, beans, squash, and hemp.

7: Mikesell ,K-4,5 (1955-1957) 1961

MX3 Rif
Jebala MX2
Senhaja MX4

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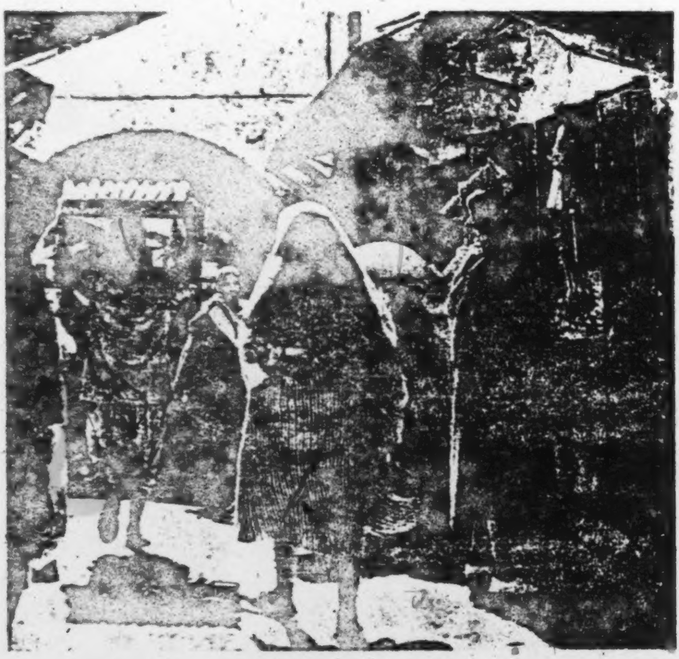

a. Street scene in Tetuán.

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b. The Thursday market of the Aith Seddath.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3
Jebala MX2

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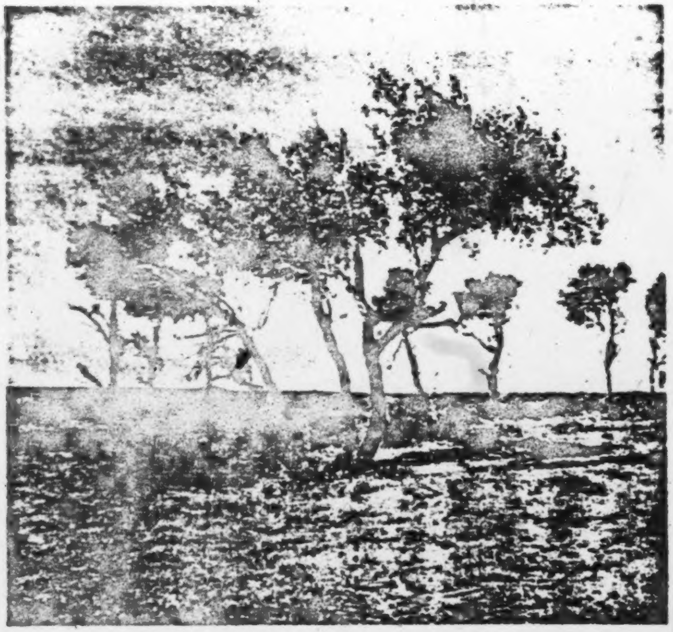

a. Mutilated cork oaks in an area overrun with goats.

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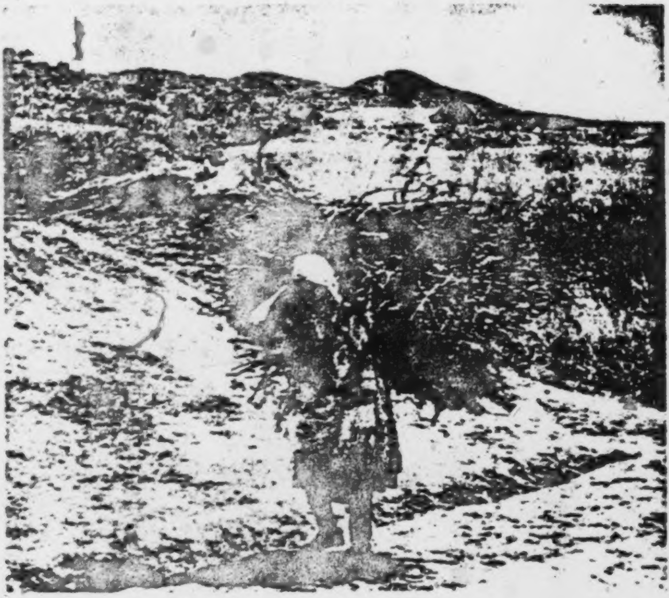

b. Jbalan woman with a load of firewood.

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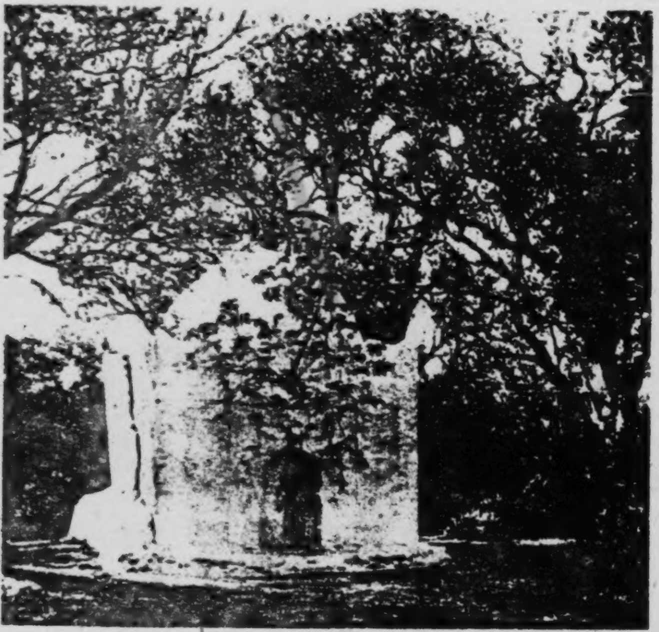

a. Protected forest at the tomb of a saint near Tetuán. Mature specimens of *Olea*, *Callitris*, and *Pistacia lentiscus*. Cf. fig. 25, *b*.

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b. Sacred clump of cork oak on the site of a shrine near Shawen. *Cistus monspeliensis* appears in foreground.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif
Senhaja MX4

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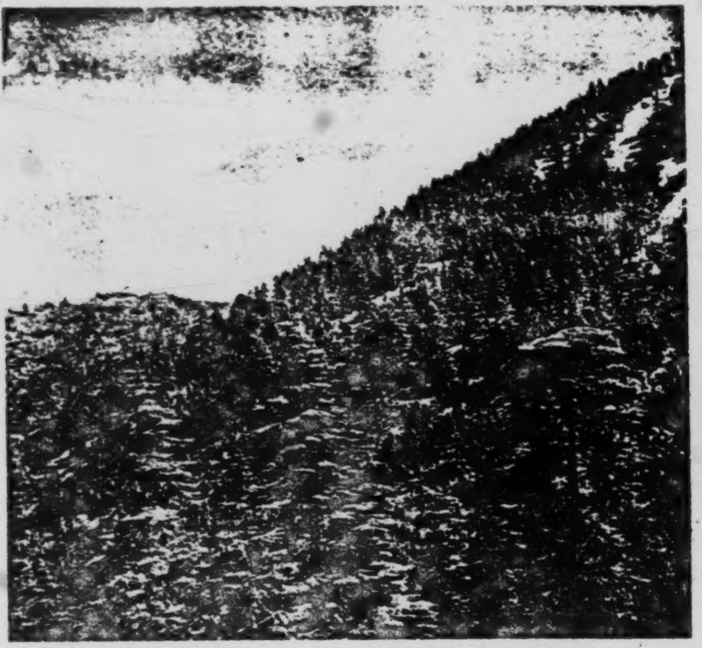

a. Cedar forest on north slope of Adrar Tidighin. Cf. fig. 28.

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b. Gullies and slide scars on a cultivated slope in Sanhajan highlands.

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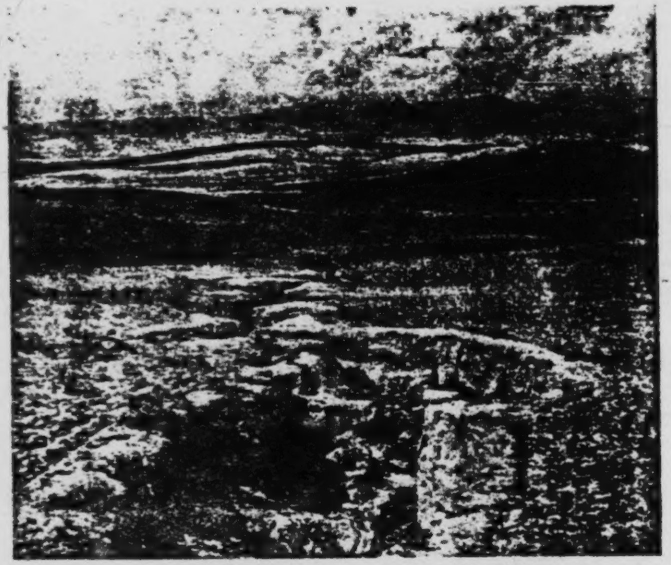

a. **An active gully in the eastern Rif (Aith Said).**

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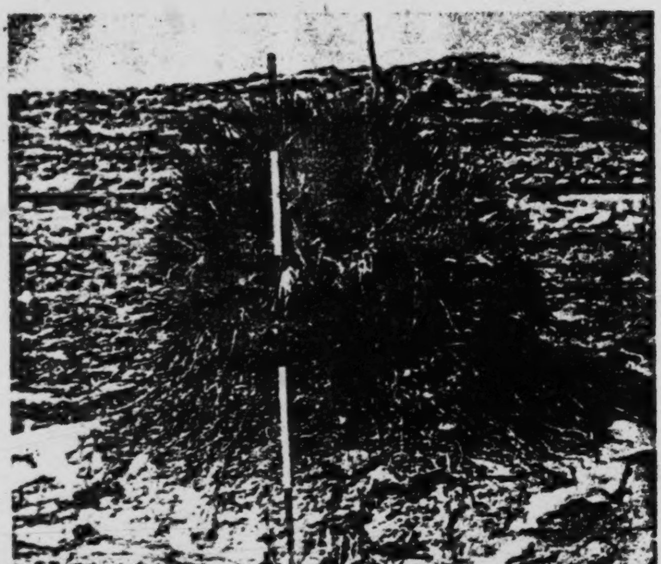

b. **Mound of soil preserved by palmetto roots near Alhucemas. The remainder of the slope has been eroded down to limestone bedrock. (Each unit of scale is equal to one foot.)**